MODERN PLASTICS

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SEPTEMBER, 1935 VOLUME 13 NUMBER 1

• OF GENERAL INTEREST

Moldings from England 11
by R. E. Dodd
True Colors That Last 17
Two-Timing Molds for Profit 18
by Eve Main
Designed to Sell 20
New Parker Desk Sets 24
Pushing Back Frontiers 25
by H. D. Bennett
Bigger Better Bubbles 33
Think It Will Rain? 36
Sheaffer Redesigns Desk Sets 40

• TECHNICALLY INCLINED

Production Relationship to Size of Mold 16
by D. A. Dearle
What Shapes for Phenolics 21
by Franklin E. Brill

• NEWS AND FEATURES

Today—Tomorrow—and Then? 22
Fun at Buckwood 23
New Things This Month 34
New Ideas 38
Keeping Posted 42
Machinery 47
Literature 49

N. S. STODDARD

NEXT MONTH

N. S. Stoddard, Plastics Department, General Electric Co., has written a short review of the development and technique in molding the Toledo Scale Company's new scale housing, together with a brief description of the specially constructed press used in its molding.

R. E. Dodd writes interestingly on the subject of plastics in Germany and his article will be illustrated with photographs of intricate specimens of extrusion molding, exciting to manufacturers and molders alike. No one will want to miss this.

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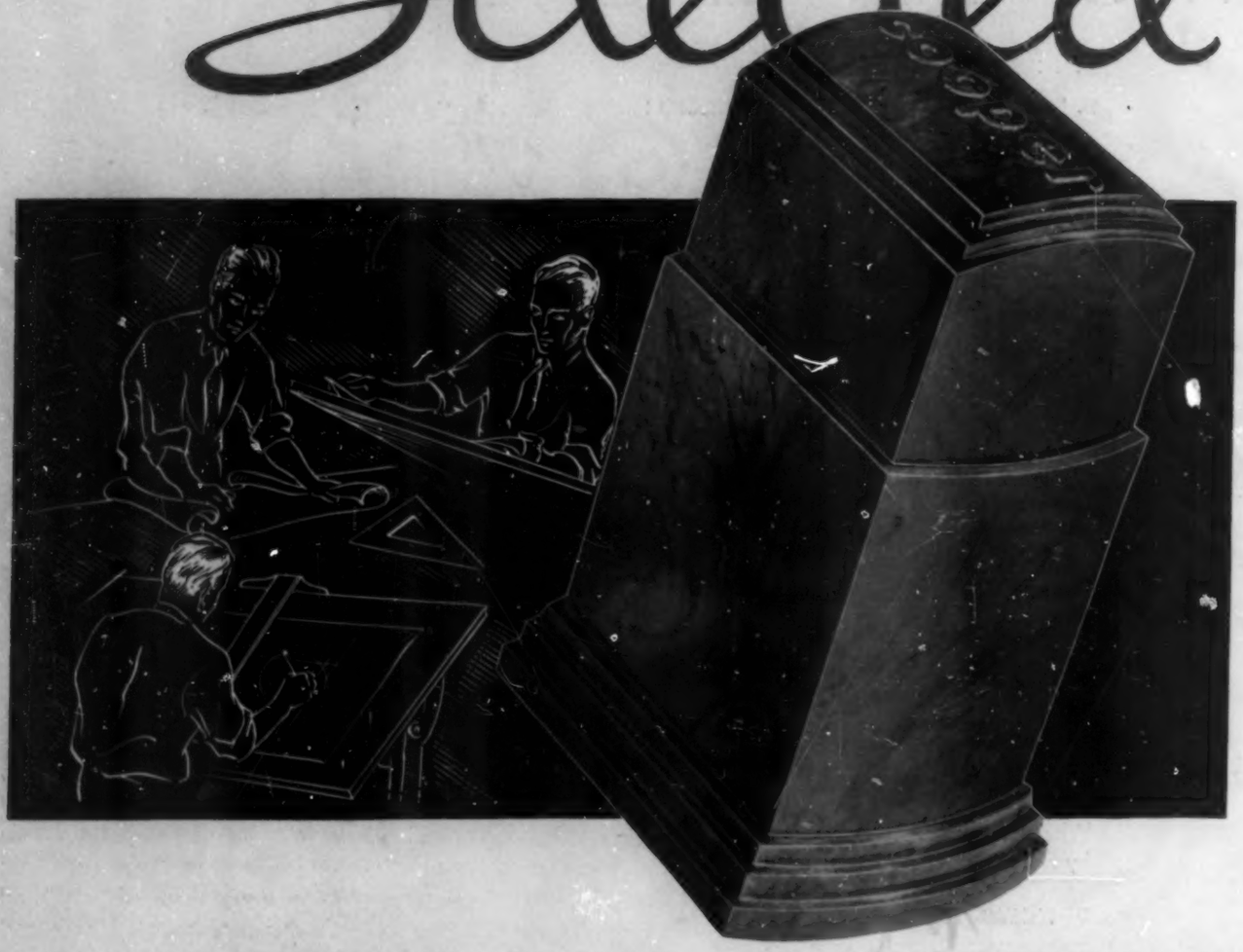
ADVERTISING PAGES REMOVED

BOONTON MASTER MOLDERS

Selected



—FOR HIGHEST SKILL IN DESIGN

Boonton Molding Company gets the Call for Cooper Razor Kit

SALES jumped when Cooper and Cooper introduced this new razor kit.

Design is one reason. There's a compartment holding ten new blades, and a hidden receptacle for a year's accumulation of old blades. (Being Bakelite, it can be easily washed.)

Then—beauty. In combinations of red or green top and base, with black bodies; in mottled effects; or in natural Bakelite—it's actually an ornament.

Of course the Boonton staff originated the design—it's the kind of job that requires Boonton skill. The top and base must be molded to assure snug fit, yet permit instant removal. And inside, the three separate compartments must be molded at the same time.

Routine work for the Boonton Molding Company! Its equipment is modern—its personnel, practical men who have grown up in molding.

Give us an opportunity to show you what can be done to modernize your product.

BOONTON MOLDING COMPANY, Boonton, New Jersey

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SEPTEMBER 1935 VOLUME 13 NUMBER 1

MODERN PLASTICS

BRESKIN AND CHARLTON PUBLISHING CORP.

Moldings from England

by R. E. Dodd

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THE first impression one gathers of the plastic industry in England is the great quantity and variety of molded articles seen everywhere. It almost seems that no stone has been left unturned in developing every possible use of molded plastics to its utmost. In the electrical field there are not only the usual insulation and wiring device parts but also lamps and telephones including the base. The majority of radio cabinets seem to be molded and large ones, too. On automobiles there are regular insulation parts, various knobs and ash-trays, even dash boards. Door knobs, escutcheon plates and push plates are everywhere in evidence. In the packaging field, caps, boxes, containers for shaving soap and shaving sticks, and traveling kits are seen in good quantities.

Remembering that the plastic industry in England started years later than in America it seems that a great amount of very intelligent development and selling has been done to bring this situation about, particularly in a country known for its conservative habits and hesitation in adopting new ideas and with a population only one third that of the United States. Actually in proportion to population the plastics industry has grown much faster in recent years and is now much larger proportionately than in the United States. The volume of production on individual items is of course less, due to

1. Drainboards, 16 x 20 inches, of black and colored ureas are being molded in England. Surfaces are fluted and tapered to fit snugly against enamel sinks

2. Ribs for strengthening appear on the under side of the drainboard and the heavy molded apron with rounding corners gives further strength, yet the molding is exceptionally light in comparison with other materials commonly used

3. Hospital trays for surgical instruments and trays for the display of foods in stores are also molded of white urea, and are easily cleaned. The largest tray shown is 17 x 17 inches

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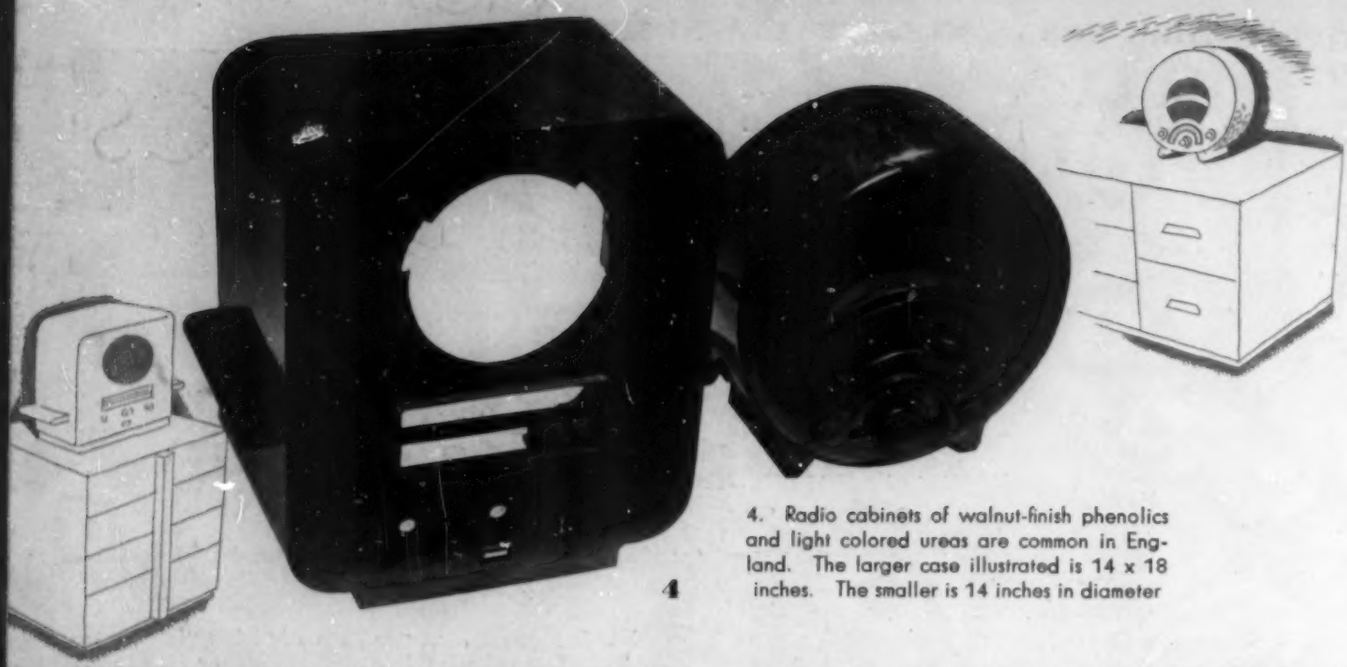

4. Radio cabinets of walnut-finish phenolics and light colored ureas are common in England. The larger case illustrated is 14 x 18 inches. The smaller is 14 inches in diameter

the smaller market but individual initiative and originality have developed many more applications to worthwhile proportions.

The industry started in a very small way, many shops consisting of one to three presses operated in a shed behind a man's house. Some of these still remain, but there are now approximately two hundred molding concerns many of them in large modern plants recently constructed, well laid out and containing new, efficient equipment. The industry has had the same problems of under capitalization and severe price competition as in the United States, but has apparently been successful financially as evidenced by the fact the molding plants are continually being enlarged and new ones being built, and that there have been no failures of firms doing trade molding only. Trade molding has been hurt by the growth of consumer molding and it is estimated that at present fifty per cent of the total production would come under the latter heading. Material concerns have been bothered by the tendency of large molders to produce their own material but this never has reached large proportions and the trend is now the other way. Tool making concerns have apparently prospered as it is thought that nearly ninety per cent of the molds are made by firms specializing in this work. In some cases material manufacturers go so far as to offer a co nplete service of design and mold construction.

Plastic materials used in England cover the same general range as in the United States—some to a greater and some to a lesser extent. Phenolic molding compound is used in much the greatest volume and is supplied by five manufacturers. Prices for the various grades are roughly fifteen per cent higher than in the United States. Fewer grades are manufactured and certain applications are apparently limited because special grades which would make them practical have not been developed. The use of phenolic material has increased every year and is still increasing but not as rapidly as that of urea material. The molded applications of phenolic material are much more extensive and diversified than in the United States but apparently the use of phenolic resins for purposes other than molding compounds is still comparatively undeveloped. Phenolic oil soluble resins are being made but their adoption is slow and less effort is being expended in developing them.

The use of sheet laminated material has evidently not been extensive, but the general opinion is that there will be a tremendous growth in the use of this material in the future, particularly for tabletops, desks, counters and paneling. Considerable development and promotional work is now being done to bring this about. Cast phenolic resins evidently are not used to a very large extent due to the fact that casein is quite firmly entrenched and satisfactory in its applications.

Cold molded or bitumen plastics are still used in quantity and several firms concentrate on making cold molded parts. Use of this material is not expanding to any great ex-

Mr. Dodd recently returned from a visit to Europe where he made a close study of plastic developments in several countries. He tells here of materials and methods in common use and reveals startling progress made by ingenious molders in England. Next month he will write about what he saw in Germany. These English and German moldings are on display at the offices of Modern Plastics, 425 Fourth Avenue, where you are cordially invited to inspect them.—Editor

tent. Shellac compounds are used in rather large quantities and the recent low price of shellac has stimulated this somewhat.

The largest recent growth has been in urea type material. A good part of this growth is due to the fact that wood filled urea molding powder is rapidly replacing phenolic colors. The price is but very little higher than that of phenolics and, although greater molding difficulties are involved, the advantage of nonfading colors has made this material desirable. Urea material finds a large outlet in chain store articles and also in high grade items in good shops. It is generally considered that the humid climate in England makes possible the use of urea material for many articles that would be impractical in dryer climates due to cracking caused by drying out of the material.

Cellulose acetate molding compound enjoys a wide use. Molding is done almost entirely by the injection method in special hand pneumatic or hydraulic machines imported from Germany or made in England. This method of molding has resulted in quite low prices for the finished articles as three to four heats are produced per minute. Although the machines and the molds are small, the labor cost of molding is quite low and, of course, the small molds are cheap to construct. These two factors, combined with the strength of acetate material which makes it particularly good for certain applications where resistance to heat and cold flow are not important,

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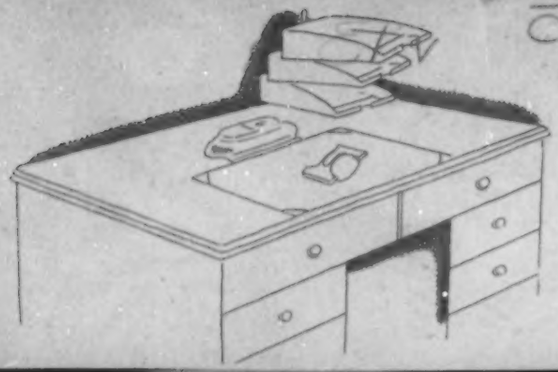
5. An interesting group of building hardware, all of molded phenolics and sold in the British equivalent of our 5-and-10-cent stores. Prices there, however, are threepence and sixpence

6. Urea moldings in a variety of applications and delightful coloring. The hors-d'oeurve dish in the center has seven removable parts which fit neatly into the central tray

7. Household utensils of molded ureas chosen at random in a threepence and sixpence shop



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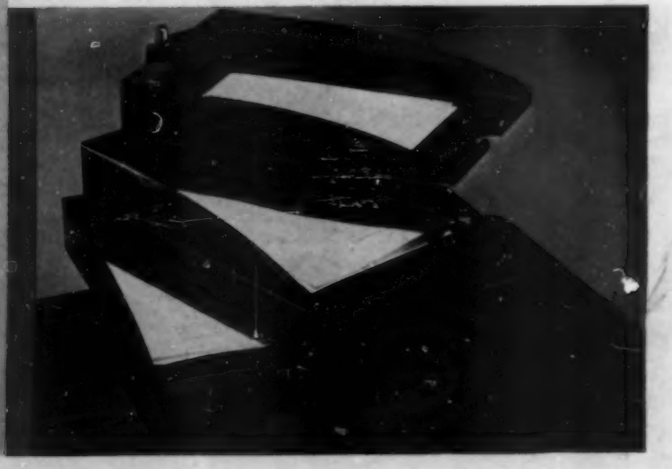

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have built up a large volume use in a comparatively short time. Fountain pens are made from a soft grade, tooth brush handles from a medium grade and certain insulation and shock resisting parts from a grade which resists heat up to 200° F. but has a poor finish. It is felt that the use of this material will increase greatly as the injection method is further developed and the material itself improved.

The polystyrol type of material is used to a fair extent and most of it is imported from Germany. It is molded by injection and is used in place of acetate where good electrical qualities and resistance to water and chemicals are considered important.

A comparatively new English material is one called Leukon. This is supplied in cast form and in powder for molding. It is a thermo plastic type but is said to have a melting point around 212° F. It can be made very clear so that it should be suitable for watch crystals and lenses. It is still quite new and definite applications have apparently not yet been determined. Certain molding difficulties

8. Phenolic moldings from a stationer's shop. The large bowl is of translucent red resin. Tape measures and dating stamp are both encased in molded housings

9. Urea and phenolic moldings for use in package assembly showing remarkable variety and ingenuity. Nothing over sixpence

10. Three-tier letter file for office desks. The molded trays are quickly detachable from a chromium upright clamped to the desk

are involved as with all new materials and at present the cast type seems to have better possibilities.

Pure phenolic resin for molding is supplied by two concerns and a fair volume of this material is used primarily in the decorative field and for tail light lenses. The curing time is approximately twice that of ordinary phenolic molding compound.

There is nothing very startling in the English methods of molding but one is impressed by the up-to-date equipment and general efficiency. Presses are of all sizes and many large ones have recently been installed to produce the large pieces that are being made in good quantities. These large presses are used for single cavity molds for radio cabinets and drain boards rather than for many cavity molds for smaller articles. However, presses up to two hundred and fifty tons are in many cases used for multiple cavity molds.

Many plants operate on a high pressure system only using presses that are closed by small side rams to avoid too great a pressure when the two parts of the mold first come in contact. While the press is closing to this point, water from a chamber at the top of the press feeds into the pot by gravity so that no high pressure water is used on the main ram except in the final closing. When the press is opened this water is returned to the chamber ready for the next stroke. This method results in saving the expense of a low pressure insulation, very little use of high pressure water, and a small amount of waste water. (*Continued on page 60*)

11

11. Bell boxes and flashlights are found among all sorts of molded electrical devices in the British 5-and-10 cent stores

12. Bracelets in England, as in America, are made of plastics

13. Nothing equals molded phenolics for smokers' articles. The light-as-you-pull match holder, illustrated, is refilled by unscrewing the core within the match assembly. Ash tray in the foreground has cork post for tapping ashes from pipes

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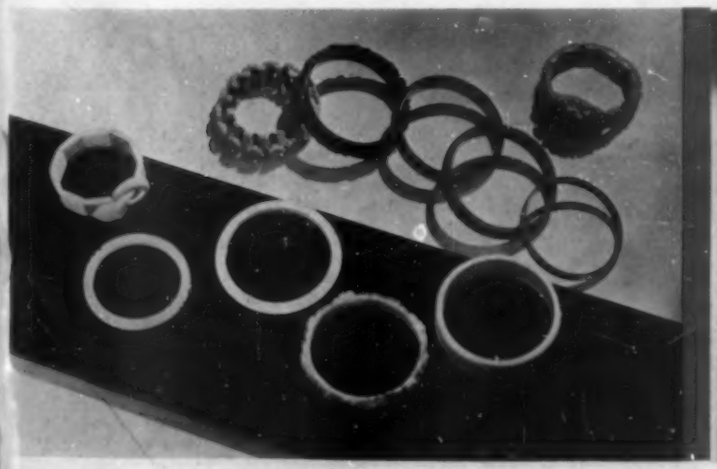

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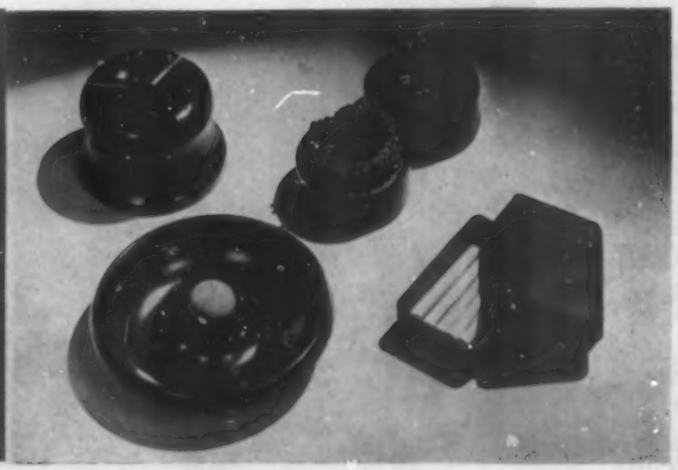


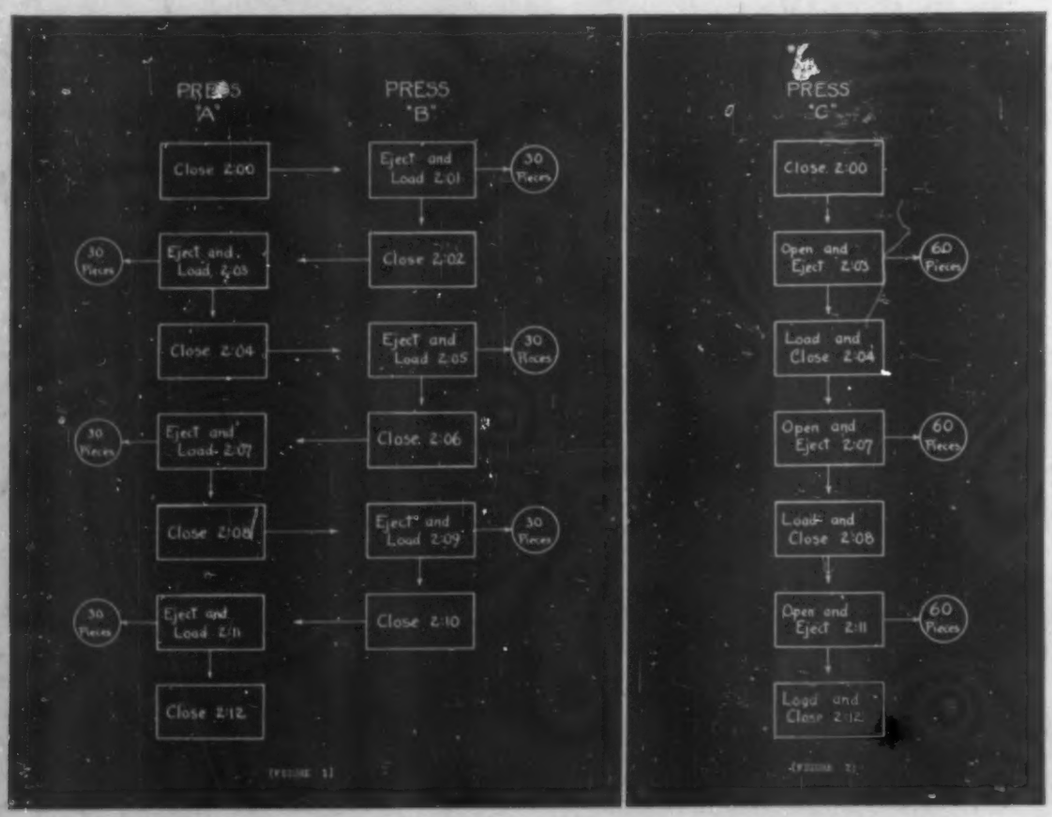
Production relationships to size of mold

by D. A. Dearle

IT is only natural that the aggressive manufacturer today should display a certain amount of caution before giving final consent to making changes in his product and especially is this true where these departures require the use of plastics. At the outset he is faced with a considerable mold expenditure and any venture that involves an investment of one or two thousand dollars can hardly be made without first giving the matter due amount of forethought. Once he has definitely decided, however, that molds are to be constructed his next step should be in the direction of determining the most economical size of mold for the particular purpose. In other words he must decide whether he wishes to have an excessive initial die cost and thereby obtain a large mold, or spend less money for the mold and thereby increase the price of his finished parts.

Numerous mathematically computed equations have been derived for determining the most economical size of mold for any required production of molded parts, but these formulas usually take into account die amortization thereby laying insufficient stress on proper volume control. While they are undoubtedly of valuable assistance to the molded products estimator in the predetermination of the correct number of cavities for each particular problem coming to his attention, the layman recognizes one fundamental fact only, viz., that an increase in the number of cavities affords him a decrease in unit cost. The great majority of molded products buyers have been educated to recognize this elementary rule and are consequently prone to recommend molds of maximum capacity in an attempt to bring the finished piece price to a minimum. Where, for instance, a certain price has been quoted on a thirty cavity basis a lower figure based on a sixty impression mold is not only sought, but often obtained. Without a doubt if the additional mold expense can be reconciled and if requirements warrant it, there is much to be gained by the use of a larger die, but anxiety to obtain the lowest possible price is likely to make obscure a factor which by no means should be overlooked.

Steady production is fully as essential to the average manufacturer as the procure- (*Continued on page 57*)



True Colors That Last

ONE of the major difficulties in all paint and varnish selling is the problem of demonstrating to the customer the exact effect he will secure with any given shade of color. Paints and lacquers in the can never look quite the same as they will when brushed or sprayed upon a surface. Nor is it always advisable to permit the opening of the can for inspection.

To get around this difficulty, paint manufacturers have, for many years, resorted to the use of color charts of various types. Printed charts, or those made by pasting up sections of colored paper or cardboard, usually failed in their purpose because of the difficulty of securing an exact match, because of the tendency of such charts to fade with the passing of time and because neither printing nor colored paper could accurately convey the gloss actually obtained. The use of painted sections of metal or wood, while conveying a much more accurate picture, usually involved too great an expense for individual sampling and such samples were not of convenient size for customers to take home where color comparison could be made.

The Sherwin-Williams Company has found an ideal method of eliminating this difficulty in marketing its Opex Lacquer Enamels for auto refinishing. Its color chart, pictured above, consists of a number of rectangular sections of thin cellulose nitrate tipped-on to a color-printed broadside. The various colors available are sprayed on long sheets of cellulose nitrate which after thorough drying, are die cut to the desired sizes and then attached in their proper positions to the large printed sheet. A grade of pure white cellulose nitrate is used to insure against discoloring of the sprayed finish. The high polish of this white base permits the lacquer to dry with a smooth and evenly high gloss identical to that which will be secured when used on a car. Since the adhesive qualities of the material used for attaching samples to the broadside are high and uniform, none of the chipping tendencies common to other materials are experienced, even after the color chart has been through long and hard service.

Dealers are supplied with folded color cards for giveaway purposes and with a similar card, mounted and framed, for use in display and demonstration. The Sherwin-Williams Company reports a marked degree of success experienced with these cards which it ascribes largely to the novel manner in which the true finish has been displayed.

The reverse side of the folder carries a complete advertising story of Sherwin-Williams Opex Enamels. Description of colors, color-matching instructions and modern automobile refinishing methods are clearly outlined to carry the selling story as well as the color chart into the prospect's home. And the folder, or booklet as it is called, may be mailed by dealers to those interested in enamels as well as in answer to similar requests directed to the home office of the company.

Credit: to the Celluloid Corporation for development and manufacture of sheet Celluloid used.

Two-Timing Molds for Profit

by Eve Main

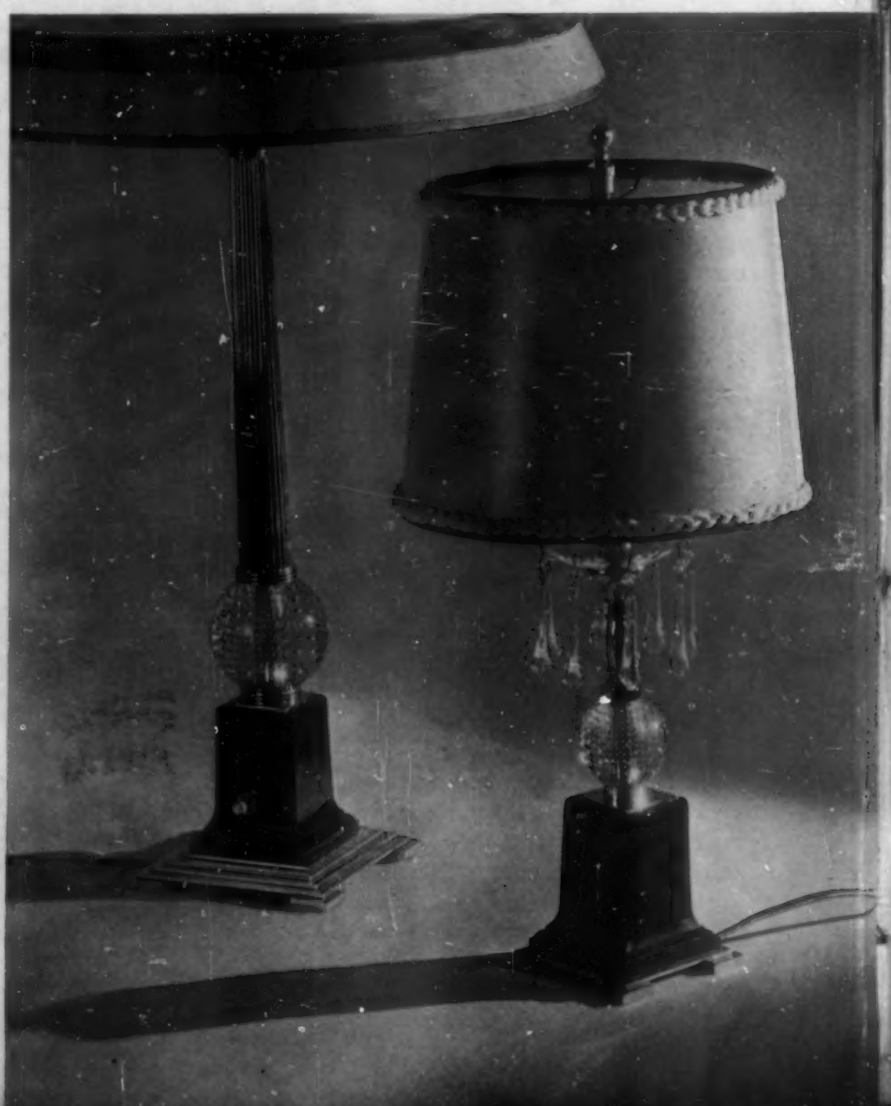
THE Quaker Lamp Company is using molded plastic bases for the first time this Fall. In doing so, it has been practical to produce a radio lamp, otherwise impossible, and the troublesome question of mold costs has been solved—for the time being at least—by using moldings originally designed for trophy bases.

For the past four years this company has been busy with the production of high grade lamps specializing in copper and chromium bases fashioned from sheets of the metal in its own factory. In preparing its new Fall line, however, considerable difficulty was encountered in producing a satisfactory metal base for a new radio night lamp of unusual design. The design called for a six-watt bulb concealed within the opaque base so that the only visible light would be distributed through a bubble-glass ball at the top.

"Inasmuch as we were familiar with working metal of all kinds," says Mr. Elsner, sole owner of the company, "we naturally experimented with this material first, but without success. We found that even though the bulb was small, the metal became so hot after the lamp had been lighted an hour or so it couldn't be touched. We tried glass, but that also heated rapidly and became impossible to handle within a short time. Therefore we had to go outside our factory in search of a suitable material. It was a happy chance that led us to a consideration of plastics. After a few short experiments we found that a plastic base held very little heat even after the six-watt bulb had been lighted several hours. In addition, plastic being a non-conductor of electricity, we could bring the wiring connections directly through it without danger of short circuits."

Mr. Elsner points out that the cost of molds for these new lamps would have prohibited the use of plastics, but fortunately, he was able to use stock molds which bring the lamps within the same price range as though produced in metal. The only alteration necessary in the molded part is to cut a circular opening in the top of the

By using lamp bases of phenolic moldings originally made to support trophies, Quaker Lamp Company reduces mold costs to exactly nothing



The six-watt bulb concealed within the base of this radio lamp could be used only in a plastic shell. When metal was tried, it became too hot to touch. The opaque plastic molding permits light to be distributed only through the bubble-glass ball at the top

piece to insert the electrical socket and bulb.

The Normandy Radio Lamps, as they are called, are being made in four sizes. Three of them have round plastic bases and the fourth a square base tapering toward the top. The plastic in each instance is mounted on a thin sheet of metal with chromium feet. The small bulb is set into the plastic base and a round bezel is fitted into the circular opening at the top. A red, green or clear glass lens in the bezel is shaped to form a resting place for the solid hand molded bubble-glass ball that completes the ensemble. The lens reflects a myriad of colors in the glass ball which is hand molded especially for Quaker Lamps and this, combined with the chromium and black plastic base, produces a distinctly decorative as well as useful lamp.

By obviating mold costs for the plastic parts these radio lamps are kept within a retail price range where a satisfactory year-around volume can be obtained.

"It is our hope," says Mr. Elsner, "to bring the smaller radio lamps down into a popular price range when we get into production and it is entirely possible we may eventually be able to produce these at a lower retail price with considerably increased volume."

Another interesting addition to the Quaker Lamp Company's Fall line is a modernized colonial lamp with a molded black phenolic base.

"Well-known designers," states Mr. Elsner, "have done much in modernizing French and English period furnishings and their efforts have been considered successful, but as far as I know, this is not true of the colonial. So, for the first time, we are attempting to modernize a colonial lamp."

This modern colonial model stands $19^1/_2$ inches high. It rests upon square chromium feet attached to a thin sheet of chromium, upon which is mounted a square, black plastic base tapering toward the top. A bubble-glass bead is held in place by a chromium turning which rises to support a glass saucer fringed with "tear drops," and in the saucer is an electrical socket for one bulb. A lumarith shade is used with this lamp which retails at a good price.

A new Student Reading Lamp has also been created with a plastic base. Mr. Elsner is particularly proud of this number because it has been approved by the Illuminating Engineers' Society for scope, effectiveness, safety and construction. Dealers everywhere are enthusiastically promoting lamps which bear the tag of I.E.S. approval because of the rigid tests required by the Society. This student lamp is 29 inches high. A square black plastic base rests on a thin chromium plate with chromium feet, similar in arrangement to the modernized colonial lamp. A bubble-glass bead surmounts the base and from it rises a reeded chromium column topped with a cup-like holder which supports a frosted glass globe as for indirect lighting. This in turn is covered by a parchment shade treated with a special coating process to reflect light downward without scattering it across the room. A three-lite bulb supplies 50-, 100- or 150-watt lighting at the turn of a switch. The black plastic base does not glare as metal would under (*Continued on page 56*)

Two different colors of phenolics are here molded with a single operation in one mold. A box of one color, with base and cover of another, is the happy result

AT last, someone has made a plastic razor package that is more than a box. It holds your razor and blades, and provides a safe depository for used blades—both in one. Its on-end design makes it distinctly practical because it will stand on the narrow ledge of the wash basin while in use and occupies but half the space of conventional razor boxes on the bath room shelf. Men will like this and rejoice.

When Cooper & Cooper, manufacturers of razors and blades, decided to create a new package for their product, they went into a huddle with all sorts of boxes. Paper boxes, wood boxes, metal boxes and boxes of plastics were examined with a healthy skepticism.

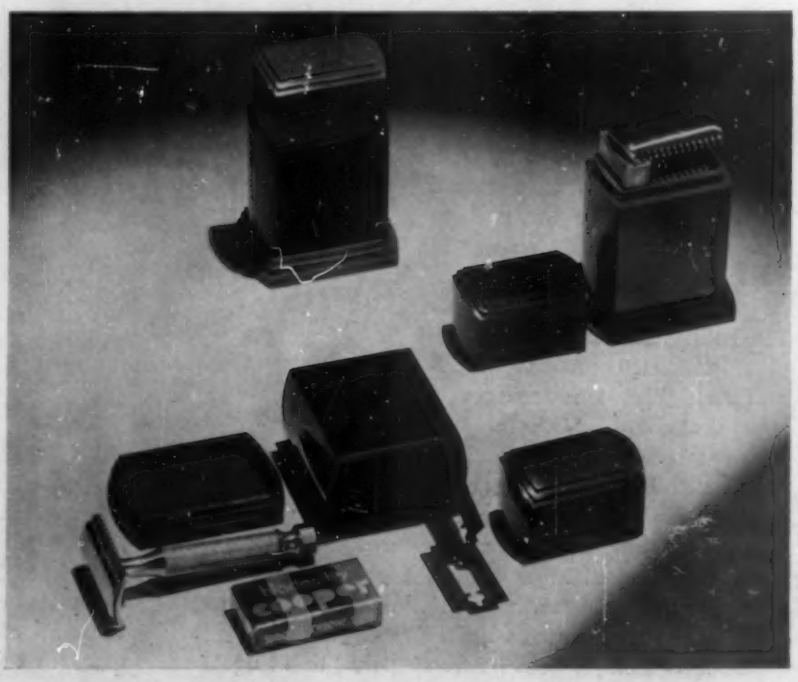
"Whatever we use," said Leon Cooper, "it must be more substantial than paper and have a finish that is permanent and easily cleaned. It must not warp, chip, rust, nor tarnish."

"Then it looks as though it will be made of plastics," agreed brother Harry. "But why make it an ordinary box? That has been done in other materials. Besides, there are three or four razor packages in just such plastic boxes now on the market. Let's make it a practical razor kit—and do it right."

At this point, Eleanore Groos was called in to study the problem and submit designs. She tackled the job from a merchandising angle, considering first the utility value of the container under actual home conditions, which after all, is the real test of buying appeal. This gave it upright design to increase convenience and conserve space. Next, she considered color appeal and since she was designing for plastics there was an ample range of colors from which to choose. Two rough sketches were submitted with approximate costs. After one of these basic designs had been chosen, colored drawings were made to determine proper color combinations and their relationship to size and shape. Models were then made and checked for buying appeal, counter and window display value. Dealers' opinions were solicited. The final model proved to be not a razor blade box, but a practical container for a completely assembled razor, a package of blades, and a safe place for disposing of old blades for the time being at least.

The new Cooper Razor case consists of a cover, center and base, all molded at one time in a three-piece mold. The base fits snugly and can be removed only by a rugged pull. The cover fits with close tolerance but is easily removed. This manner of construction permits an attractive combining of color with the cover and base in pleasing contrast with the main body of the case. Molding colored material and black in the same mold at the same time requires a rather high degree of molding technique. Shrinkage varies between the different colors yet the base of the case must fit tightly for semi-permanence while the cover must have only a comfortably snug fit for easy removal. The design is smart and modern and design patents have been applied for. Color combinations are red and black; green and black; and brown and tan. By alternating color combinations so that some have a red base and cover with black body, while others have a black cover and base with red body, six different combinations are available at no additional cost.

Boonton Molding Company did the engineering and molding. The phenolic used is Bakelite.



What Shapes for Phenolics

by Franklin E. Brill

GENERAL PLASTICS, INC.

WHEN the currently popular word "stream-lining" is applied to such things as ashtrays and packages, it becomes a little bit ridiculous. Nevertheless, it serves to describe the present trend of cleaning useless protrusions, bumps and unneeded decorations from manufactured articles—resulting in cleaner-looking, more easily-dusted and more efficient products—products which reflect our restless, moving age.

Oddly enough the streamline shape comes pretty close to the ideal contour which designers have always claimed that plastics should take. By their very method of fabrication, molded products seem to fit themselves into a smoothly flowing shape: the materials flow more easily in the molds and the larger-radius curves increase the strength of the parts. Also, the smoothness of the exterior, the absence of engraved detail, and the tendency toward more honest relation between interior and exterior results in a considerable saving of material. Housing a cylindrical object, for instance, in a "modernistic" cube-shaped case, with the attendant fillets and waste corners, is thus eliminated.

Another advantage in the use of curved surfaces in a molded piece is that they increase the apparent lustre of the material. Obviously, as any chemist can testify, there is no reason why a curved molded surface should be any smoother than a flat surface, but since lustre is not so much a matter of smoothness as it is of highlights, it naturally follows that the more curved surface a piece has, the more highlights it will reflect. An example of this is the Synchro Invigorator, illustrated. Designed by Henry J. King, automotive body designer, and molded by August F. Markus Eng. & Mfg. Co., this electrical massage device is composed entirely of curved surfaces, without one single flat area in the whole case. As a result, it sparkles from any position, dusts easily, is more glossy than the average phenolic molding, looks more efficient and handles as easily as a hairbrush. Incidentally, this black phenolic case replaces a case formerly made of pastel-colored material in a design of rather unpleasant contours. As in many cases, it was found necessary to use a more expensive color to divert attention from the unpleasant lines; but when redesigned by Mr. King expressly for black phenolic material, it was more attractive and salable than with the expensive colored housing.

● The Arvis auto radio control unit is molded of black phenolic, with ivory urea knobs and bezel, by the Reynolds Spring Company. All photos, courtesy General Plastics, Inc.

● Henry J. King, automotive body designer, designed the Synchro Invigorator, an electrical massage device, shown below. It is molded of black phenolic by August F. Markus Eng. & Mfg. Co.

Perhaps from this we can draw a general rule to guide designers. In designing for opaque material, we could say, avoid flat surfaces and sharp corners as much as possible and strive for curved contours which will throw highlights. This lends sparkle and compensates for any lack of surface texture. In translucent or transparent materials, of course, (*Continued on page 55*)

EDITORIAL COMMENT

TODAY—

TOMORROW—

AND THEN?

IF vision into the future were as clear as it is into the past, life indeed would be dull. But it cannot be said that this is a dull age. Guide posts there are, some vague, some assuring, but obstacles in one's path add zest to the game. Correctly guessing tomorrow's reaction to the venture of today often marks the distinction between profluence and inertia. It is the contradictory indications of commerce and industry that wear us down. At the recent Giftwares Show at Hotel Pennsylvania, we visited a man, who at the Spring Show had made intelligent use of plastics in preparing his line of gifts and was enjoying encouraging sales, everything considered.

"I'm getting away from plastics this Fall," he said, "people seem to prefer wood for handles and trimmings. So many cheap things have been made of plastics that I feel it is better to not associate them with my grade of merchandise in the better shops."

We left, wondering a little about the permanence of our job in a field so fickle when it occurred to us that toothpicks and clothespins are made also of wood, yet both are fairly cheap. A few doors away, we stepped into the room of another manufacturer who began using plastics in much the same manner about a year ago. We wanted to see how he had made out.

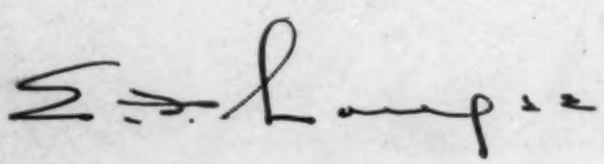
"I'm glad you came," was his greeting. "Perhaps you can tell me where I can get a plastic material in sheet form that is translucent and can be bent without expensive molds. One that will definitely hold its shape after pressing." We gave him the names of several makers of this type of material. "You see," he continued, "since replacing our wood handles and trimmings with plastics our business has grown tremendously. We are planning new numbers that within a few months will double our use of the material. We already have added two fabricators here in the East, to supplement our own plant in the West so there will be no interruption in production this Fall. People like the gay colors of plastics, and because their finish is there to stay, they buy them in preference to wood."

Contradictory as these two guide posts are, others in clear bold type point the definite attitude industry is taking toward the inclusion of plastics in manufactured goods. Makers of many gadgets are toying with plastics in one form or other. Every now and then they see a competitive item break forth in a lustrous shell of cast or molded, and they think about plastics again, deciding, perhaps, to look into the possibilities offered by these new materials. Then up pops the question of mold costs or outside fabrication and they display the indecision of a Congressman. A little research and investigation would reveal abundant evidence of actual savings in hand finishing labor costs and shipping costs to make the problem of mold costs shrink to a minor detail in the final analysis.

Substantial units of industry, slow motioned as they are reputed to be, have taken definite, decisive steps which industry in general can follow with profit. The French Oil Mill Machinery Company has just completed the largest plastic molding press ever made in this country for the Plastics Department, General Electric, who will mold the 9 lb. scale housings for the new Toledo Plaskon Duplex Scale about to be introduced. Ford Motor Company is building a new plastics molding plant to cost nearly $5,000,000. Two hundred and fifty presses are reported to have been ordered and their entire production will be consumed within the Ford organization.

Within the columns of this book are many examples symbolizing the trend. H. D. Bennett's article "Pushing Back Frontiers" (page 25) tells of persistent research by Toledo Scale Company to improve its product and increase its utility through greater accuracy and lighter weight. It may sound like prejudice when we say the success attained would have been impossible without plastics. But Mr. Bennett admits frankly that this is so. "Moldings from England" (page 11) illustrates the ingenuity of British manufacturers in modernizing their products, and uncorks a flood of ideas worthy of consideration. "Two-timing Molds for Profit" (page 18) shows how a lamp maker snooped around a bit and avoided mold costs. D. A. Dearle (page 16) discusses the advantages and disadvantages of single and multiple cavity molds in their relationship to production. And Franklin Brill's article, "What Shapes for Phenolics" indicates some of the pitfalls of design that can be avoided through a better understanding of molding requirements and molding technique.

We recommend these articles as interesting reading to manufacturers who would keep in step with the times—whether or not they are familiar with the incomparable properties of plastics as basic materials.



Fun at Buckwood

ON July 30 and 31 about seventy-five members of the plastic industry got together at Buckwood Inn, Shawnee on Delaware, Pa., for two days of fun.

The gathering was called by Gordon Brown, sales manager of Bakelite Corporation for the exclusive purpose of getting the various men engaged in the plastic industry together for better acquaintance and a good time. No business sessions of any sort were attempted.

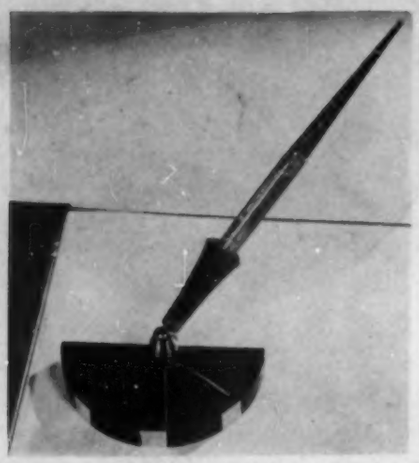
Golf was the main attraction with nearly fifty men competing for attractive prizes purchased from the money contributed for the purpose by those attending.

All branches of the industry were well represented by molders and material suppliers from both the East and the Middle West.

Prizes were awarded, at the banquet on Wednesday evening, to Allan Brown, for low gross score, and James L. Rodgers, for low net—Class A. Other winners included Douglas Woodruff, Robert E. Brannan, Fred A. Morelock, Sanford Brown, David O. Munns, Lester Phahl, Fred K. Davidson, Leo Adenbaum, J. H. Parker, David M. Buchanan, William B. Hoey, Clinton W. Blount and Ronald Kinnear.

Three committees were appointed to perpetuate the golf competition in each district. William L. Kelly of Chicago Molded Products Co. was appointed chairman of the Western division, George Scribner of Boonton Molding Company, Boonton, N. J., was appointed for the Central division and G. V. Sammet of Northern Industrial Chemical Co. of Boston for the New England division.

NEW PARKER DESK SETS



THESE pages have often shown the work of designers who have made skilful use of molded plastics and metals combinations either to create entirely new pieces or to modernize an already popular line which needed an invigorating new touch. The new Parker Desk Sets, designed by George Graff, utilizing all the advantages of plastics and zinc die castings combinations, are a recent and striking instance of the latter instance of industrial design.

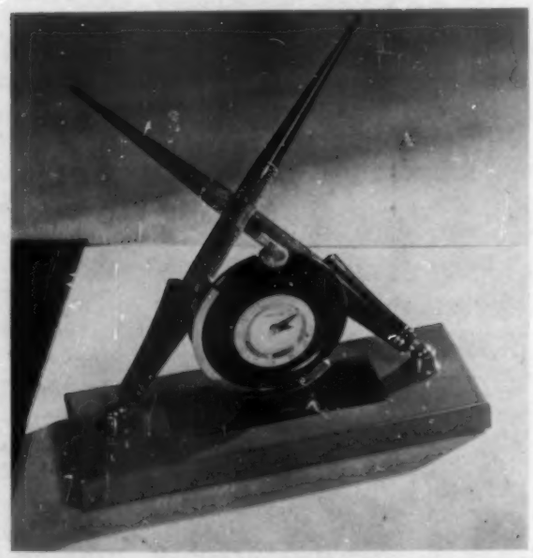
The desk sets constitute Parker's complete new line for use with their famous double-duty pens—whereby a simple taper transforms the pocket pen into a desk pen. Zinc die cast bases have been incorporated for the weight factor with occasional use of marble or carrara for the same purpose. The metal bases are beautifully finished combinations of chromium and colored lacquers. The pen receptacles of black phenolic and the pens in various colors harmonize with the color combinations of the rest of the set.

Perhaps the neatest design in the line utilizes the well-known Westclox watch, obtainable in either black phenolic or a light colored urea. Resting gracefully in its crescent chromium plated die cast holder, the watch is the useful central feature of a two-pen desk set. Or it can be easily slipped into the purse, when not required on the desk, to serve its original use as a smart handbag watch.

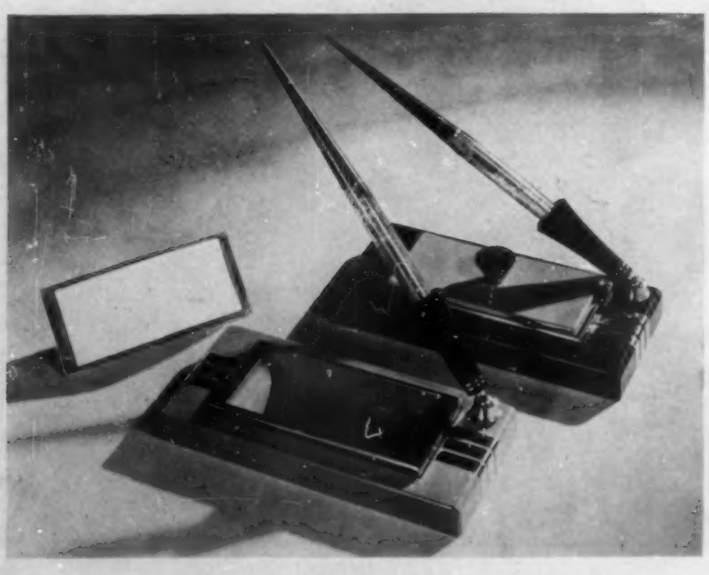
Another ingenious design for the one-pen die cast bases has utilized the base to contain a rocker blotter that is convenient to handle and which, unlike most blotters, retires from sight when not in use.

Parker has recently developed a transparent laminated design, which permits the owner to know exactly how much ink is in the pen. This feature has been well advertised and publicized by them with gratifying selling results. It met immediate public acceptance.

Mr. Graff has in the past (*Continued on page 56*)



Photos courtesy Doehler Die Casting Co.



PUSHING BACK FRONTIERS

by H. D. Bennett,
PRESIDENT OF THE TOLEDO SCALE COMPANY

A narrative of the development of the new Toledo Plaskon Duplex Scale whereby weight was reduced from 165 lbs. to 55½ lbs., accuracy and utility were increased, and a new incidental business of importance to all industry was created.

REVELATION of the following story marks a milestone in manufacturing. Far beyond any implications in the plastics industry—and *they* are quite far-reaching enough—the persistent development and final success herein outlined have created radically new ideas in construction, and basically different methods of manufacture. Very few executives or engineers in manufacturing are remote from the dynamic significance of what follows. If a plastic was finally found to solve certain long-established problems of our manufacturing business, then a plastic may well be the answer to the same problems—which are basic—in many another manufacturing business.

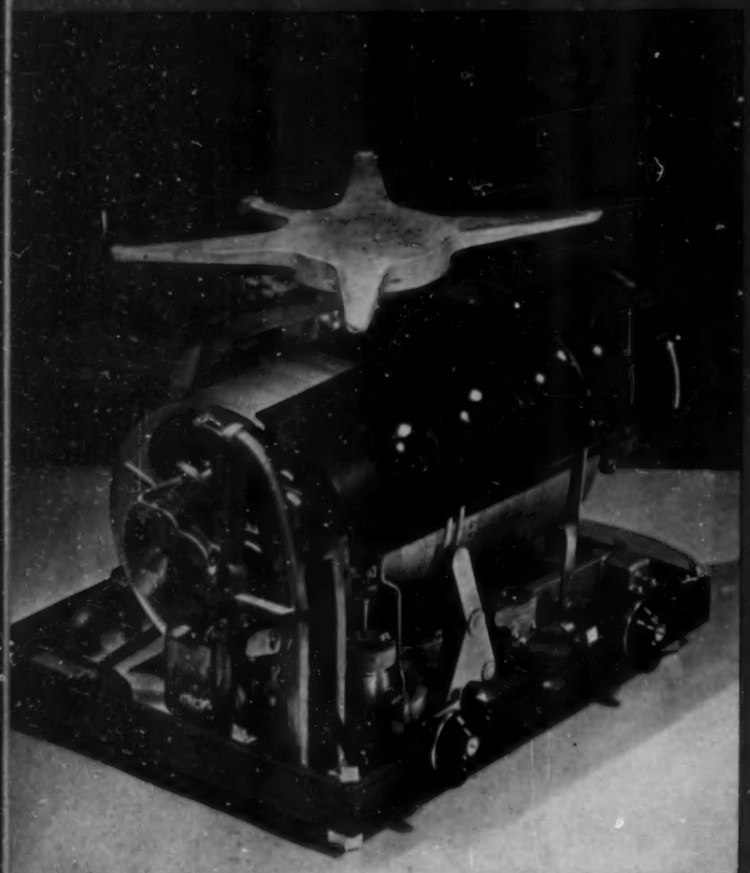
Previous to 1923, the covers or hoods of all computing scales used in groceries, butcher shops and delicatessen stores were made of cast iron and finished with lacquer. In 1923 we began covering the iron with porcelain, which had many advantages. It was easy to keep clean, it was good looking, it was permanent. But the porcelain was fused on the iron, which meant using heat up to 1400 degrees Fahrenheit. Subjected to such high temperatures, the iron tended to deform and warp, unless specially designed to meet those temperatures. Therefore the switch from lacquer to porcelain meant the complete redesign of the scales.

The thickness of the iron had to be increased and ribs added to secure rigidity during the firing process. These changes increased the weight of the butcher's cylinder scale from 70 to 150 lbs. Porcelain is excellent for fixtures such as meat cases which are not frequently moved around, but merchants engaged in the seasonal rearrangement of their stores complained of the difficulty of moving the scale. In some instances, counters were not strong enough to support so heavy a piece of machinery. At the same time, retailers refused to go back to the lacquer finish, greatly preferring the porcelain type. Of course, to the scale company the heavy scale was a serious matter, because very few salesmen could carry it to a demonstration. It almost looked as though we should have to select salesmen for brawn rather than brain.

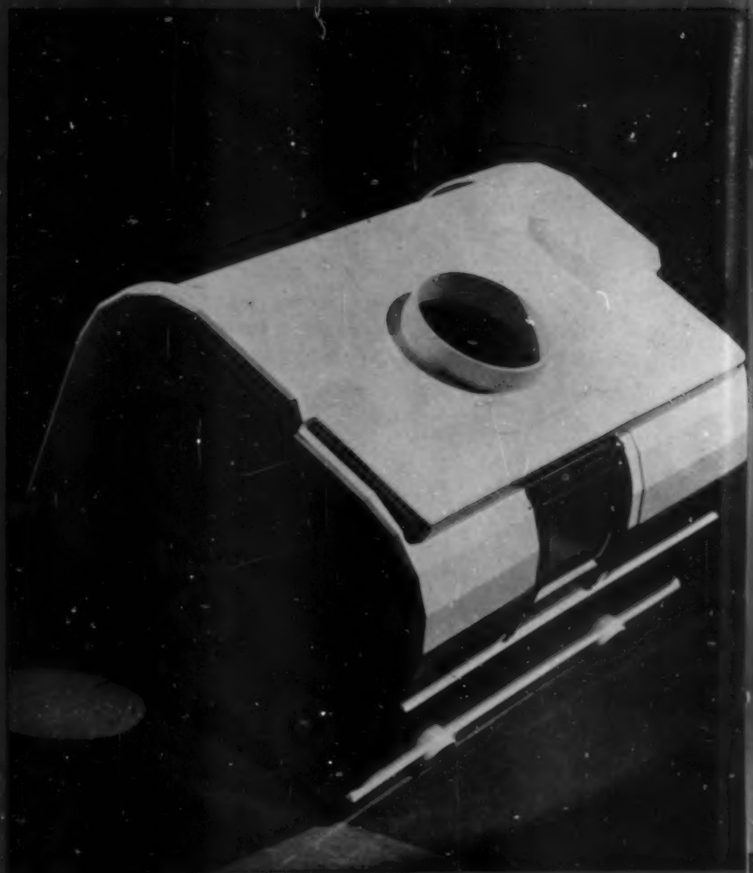
Here was a clear-cut problem. The simplest front on which to attack was to find a way of keeping the porcelain finish yet making the scale lighter. We consulted many authorities in an attempt to reduce the fusing point of porcelain, so we could use lighter iron parts. But we found this field well explored. There was no way of altering the porcelain heating process without lowering the quality of the product.

Well, if we couldn't use the same material, the logical question was "what about some other material?" We turned our attention to organic chemistry. What about the phenol-formaldehyde resins? They had many desirable qualities and had been on the market a long time. But they were available only in black, brown, and other dark colors, while scales, by rigid precedent, had always been finished in a brilliant blue white. Prece-

H. D. BENNETT



Working mechanism of new Toledo scale



White plastic case weighs less than 9 pounds

dent, however, is not always a stumbling block; perhaps there would be no color prejudice militating against black scales. We made up ten in black porcelain, placed them on retail counters, and discovered instantly that women would not buy food weighed on the dark machines.

So another possible path was closed. At this point, we went to the Mellon Institute of Industrial Research in Pittsburgh and asked them to make a complete survey of all the possibilities of applying the latest chemical developments to our purpose. After several months' study, the Institute advised us to investigate urea-formaldehyde resins. The reason for this advice was that the natural color of urea-formaldehyde resin is water-white, whereas the natural color of phenol-formaldehyde resin is heavy amber. When this dark material is loaded with white pigment, it loses something of its physical properties, and will not remain color-fast, tending to revert back to the natural amber color after molding and exposure to light.

So we started out on a thorough study of the urea-formaldehyde field. These resins had been made in Europe as laboratory products, but the samples we got were so decidedly inferior to the phenolic compounds that it was obvious much work remained to be done on them. Accordingly, we decided to sustain broad research on a fellowship at Mellon Institute to develop a urea-formaldehyde resin which should be physically comparable with the established phenolic resins, yet be capable of production in light pastel colors, and this scientific investigation was entrusted to the capable handling of Dr. A. M. Howald.

Had we at this time been aware of the immense amount of work already done toward this same end by established chemical companies, we would never have had the temerity to begin. But being ignorant of the precedent of failure, we went right ahead. After months of labor, Dr. Howald succeeded in producing a

material which met the very high specifications we set for water absorption, physical properties, and appearance. But in so doing, his research had opened up new and unsuspected horizons.

Our idea, up to this time, was simply to find a material which we could use instead of porcelain. When or if we should find it, we planned to eliminate the porcelain department of the scale business and substitute for it a resin department. But, in making tests on his embryo material, Dr. Howald several times had to use the highly specialized testing equipment in the General Electric plant at Schenectady. (Incidentally, this interchange of seldom-used and very expensive equipment is quite common among research organizations.) As General Electric technicians assisted Dr. Howald, they pointed out that the new material might have considerable use in the electrical industry. This gave us a brand new thought and we made a cursory survey of other possible uses, coming out with the astonishing discovery that applications in many other fields were far more numerous than they could ever be in the scale industry. Thus, early in 1930 we found ourselves accidentally in the chemical business. At this point, the further development was taken over by a separately financed and separately managed company, Toledo Synthetic Products, Inc.

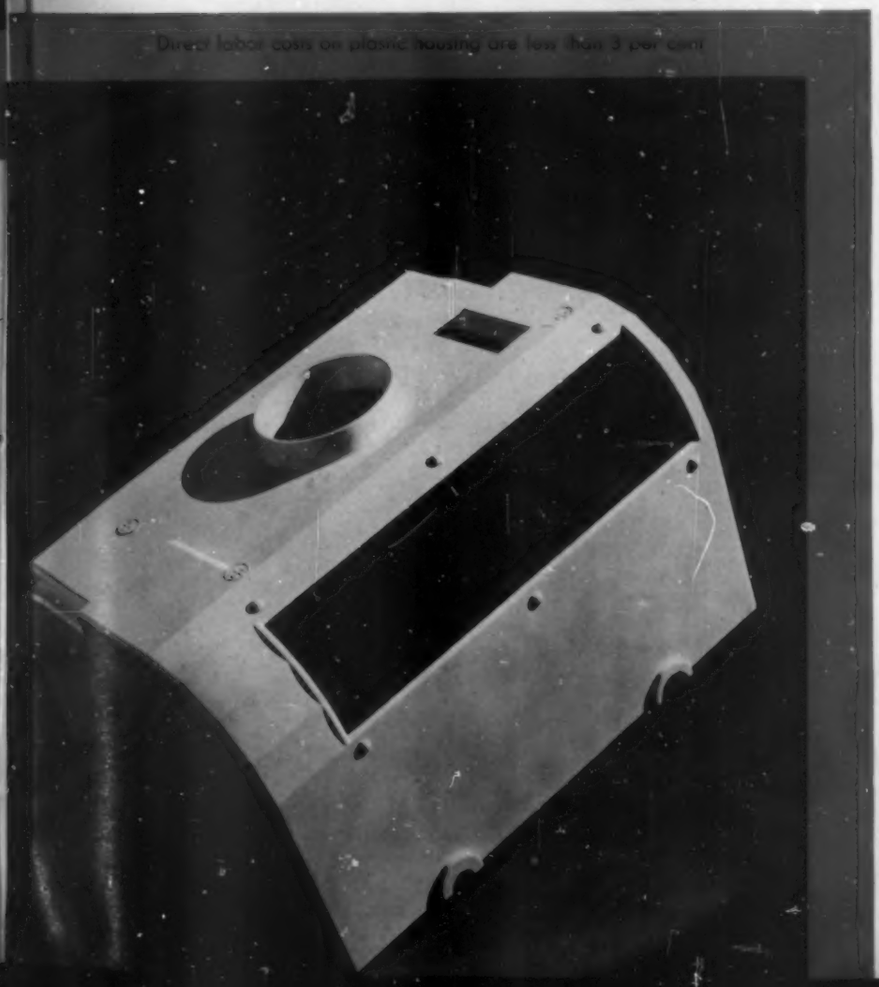
Up to this point, only a pound or two of the substance had been created. But now small capacity equipment was bought and a "pilot" plant capable of producing 100 lb. lots was set up at Mellon Institute. Experiments with this equipment made it possible to lay out a production plant of considerable size and by the end of 1930, Toledo Synthetic Products, Inc., started to place orders for machinery.

By April 1931, the company was able to offer the new material to the molding trade under the name of "Plaskon," and the new venture was under way. The spring of 1931 was not the most ideal moment to launch a brand new business, but abundant confidence in Plaskon's qualities urged its sponsors to go ahead. Sales for 1932 were six times those of 1931, and they have increased approximately 50% every year since then.

But the Toledo Scale Company, up to the second quarter of 1935, had not used a single ounce of Plaskon. Why was this? For the same reason that the first railroad cars were stage-coaches with flanged-wheels, and the first automobiles retained the old buggies' whip-sockets. We had always made our scales of iron, cast in sand molds. But to form Plaskon, one had to pour the material into a specially hardened steel mold and subject it to great pressure and heat. Therefore we awoke to the fact that a scale of Plaskon would look as different from the scale of cast iron as the modern automobile does from the old buggy which it has replaced.

The original Toledo Scale.

Just as the discovery of Plaskon's myriad uses outside of the scale industry changed the entire picture, so the revelation of an enforced change in scale design made another wholesale shift in plans and ideas. It not only invited a general overhauling of the accepted ideas of scale engineering, but it actually compelled such an overhauling. The resultant actions and reactions lead apparently far from the plastics industry; literally, however, they illuminate many of the pitfalls and the high plateaus of triumph which a manufacturer often has to cross when he once decides to venture away from yesterday and into tomorrow. That is what it amounts to when you enable your business to make use of the



Direct labor costs on plastic housing are less than 3 per cent

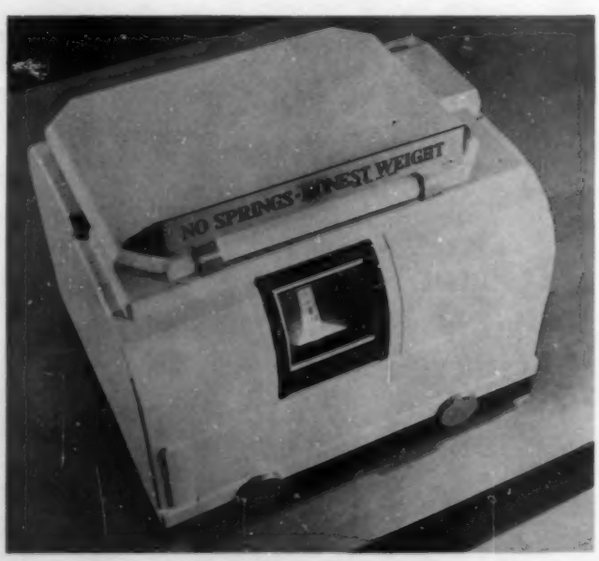
PLASKON

THESE PAGES PRESENT THE MOST IMPORTANT DEVELOPMENT IN MODERN PLASTICS. THE NEW TOLEDO SCALE IS REVOLUTIONARY IN ALL ITS PHASES. THE PHASE OF FIRST IMPORTANCE IS ITS PLASKON—MOLDED COLOR—BODY. IT IS THE LARGEST WHITE MOLDED PLASTIC PIECE EVER MADE. IT WAS MOLDED BY THE GENERAL ELECTRIC COMPANY IN AMERICA'S LARGEST MOLDING PRESS. THIS PRESS WAS AN OUTGROWTH OF RESEARCH AND DEVELOPMENT WORK ON THE NEW TOLEDO SCALE.

THE SCALE COVER

Five years of painstaking work have made possible the announcement by Toledo Snythetic Products, Inc. of the Plaskon—Molded Color—scale cover. Varied as Plaskon pioneering has been, the scale cover dwarfs previous accomplishments. This by far the largest molded plastic housing ever made *is one-fifth the weight* of the cast-iron porcelain finish housing formerly used. It *occupies 63% less space* on the counter. It is molded in *a few minutes* as compared to the several hours needed formerly to make a similarly sized scale cover. Plaskon's lustrous, permanent beauty makes it the best looking—and most sanitary—cover built. The crated scale, complete with the Plaskon cover, is *shipped at a saving of 38 lbs.* on the crate alone.

AND THE COST OF THE PLASKON HOOD? 25% LESS THAN THE COST OF THE CAST-IRON PORCELAIN ENAMELLED HOOD IT REPLACES.



NEW

MOLDED COLOR

SEPTEMBER 1935

OLD

The weight factor of scales is vastly more important than the mere reduction of bulk. Scales have to be sold—and the only way to sell them is to put them down before the merchant where he can inspect them personally. Toledo demonstrators struggled and groaned to carry about a 165 lb. scale; delays in transport; the need for asking prospects to visit headquarters lost them many a sale. The new 55½ lb. portable scale sweeps away this selling obstacle, as well as obvious disadvantages of weight.

Or take the finish of the scale cover. When laborious and expensive assembly and finishing were completed on the old scale, it was just another surface finish—peelable, crackable, discolorable. The Plaskon cover is SOLID finish, solid Plaskon. At center it is just as uniformly strong and colorful as its gleaming surface.

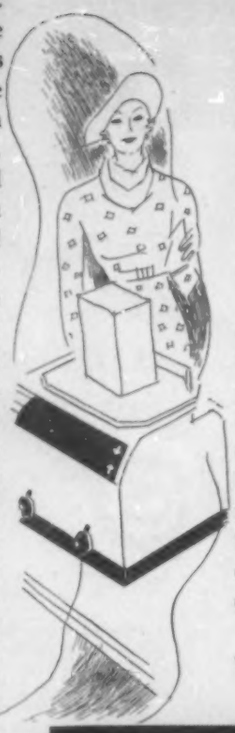
Translate this present achievement of Toledo Synthetic Products into terms of your own problems . . . your own choice of material for colorfully beautiful moldings that have to stand the gaff. At your request, the Plaskon engineers will study your problem and offer their service gladly, without charge.

THIS SCALE IS MODERN RESEARCH. THE TOLEDO SCALE COMPANY . . . THE GENERAL ELECTRIC COMPANY . . . THE ALUMINUM COMPANY OF AMERICA . . . THE BAUSCH & LOMB OPTICAL CO. . . . AND TOLEDO SYNTHETIC PRODUCTS, INC. CO-OPERATED IN PRODUCING A SCALE. THEY DID MORE. THEY CO-OPERATED IN A PROGRESSIVE ENDEAVOR BENEFICIAL TO ALL INDUSTRY. NEW MATERIALS PROVED THEIR VALUE FOR NEW USES. SEND TODAY FOR THE COMPLETE STORY OF THIS ACHIEVEMENT.

TOLEDO SYNTHETIC PRODUCTS
INCORPORATED
TOLEDO · OHIO

versatile qualities of plastic materials.

When we realized that the new scale would be so very different from its ancestors, we began to examine all the so-called axioms of our business in an atmosphere of healthy skepticism. Scales are unique in that it is illegal for them to wear out. Even though a scale is 25 years old it must still function within the severe legal requirements. If it doesn't, it must be discarded. Because of these high accuracy standards we were forced to use only stable materials—materials which will never show appreciable change of character. Thus, it used to be necessary to store iron parts for years, so that stresses would have time to set and the material could take its final form. Otherwise, the sensitive scale would register on its dial how the iron was growing or altering. Modern methods have reduced this storage time to a month; but even at that we thought it well to consider other substances since improvement was desired.

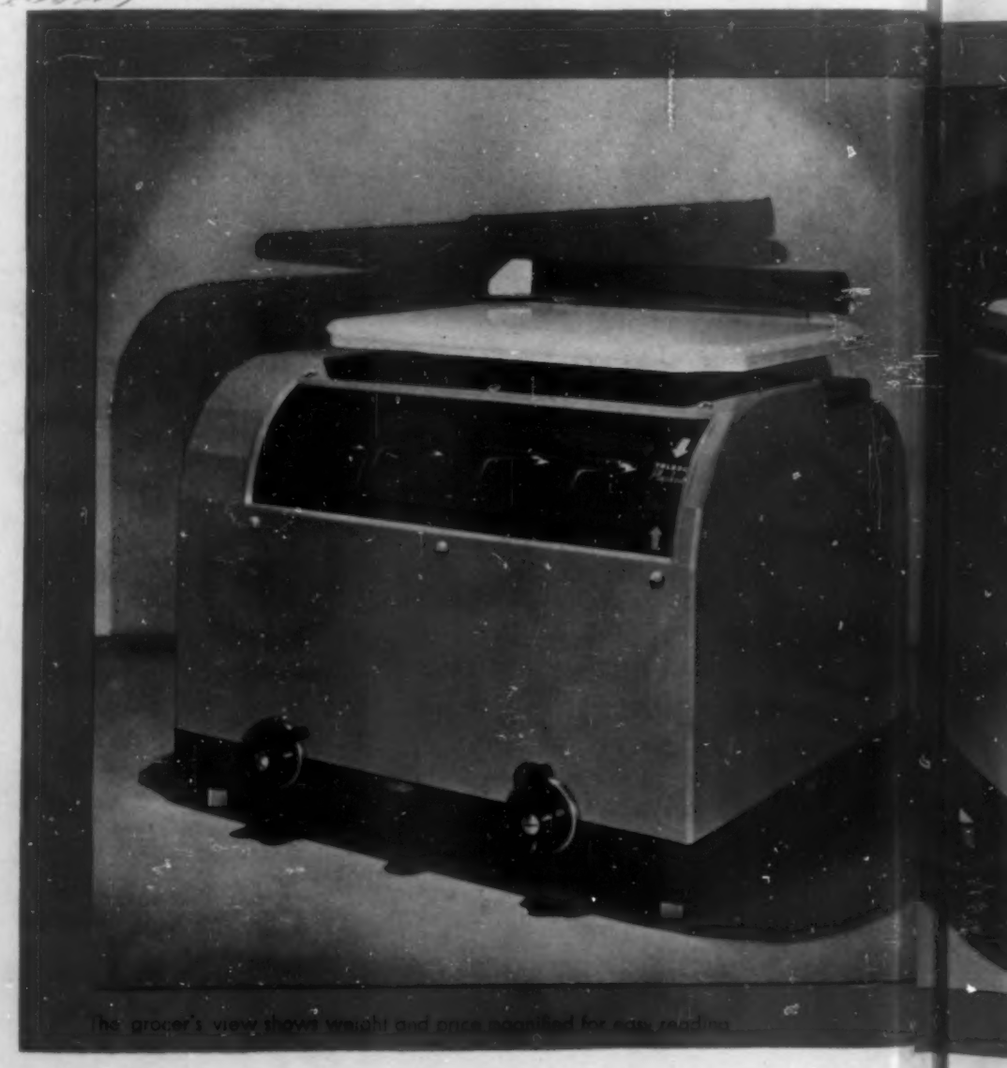


The engineers had studied pressed steel, which is lighter and more economical. But when sheet steel is deformed by a die, it tends to revert back to its original form. It is not stable. The engineers then took up research into aluminum, and went to the Aluminum Company of America's research laboratories. After months of effort, sample machines were built which in three years have shown no instability in the material.

But as the Aluminum Company experts became familiar with our problems, and our engineers became familiar with the nature of aluminum, there evolved one of the most important improvements in weighing in many years. If you recall the round barrel on the top of your butcher's scale, you will remember that inside, there rotates a cylindrical drum of paper. On this drum are printed the computations of weight figures and price graduations. It was simple enough and apparently perfect. But when a piece of meat heavy enough to weigh the full capacity of the scale is placed upon the platter, that platter is depressed about $^{5}/_{8}$ of an inch. This small movement is transferred to the cylinder which revolves nearly 30 inches. The chart magnifies the platform movement 50 times; it also magnifies any error 50 times. Now the paper chart, no matter how it was treated, would absorb water in time, and then it would buckle and show an uneven surface. Further, it was too heavy, and imparted to the scale something of the nature of a fly wheel. It wouldn't come to rest fast enough. It was an established material in this use, but it had defects. The defects were eliminated and a new superiority was obtained when our relations with the Aluminum Company produced a new aluminum alloy of such nature that a very thin sheet could be made.

This made possible the quickest-acting scale we had ever produced. Further, the aluminum would never buckle, so it enabled us to place the reading line, the fine wire which extends across the chart, almost in contact with the chart and thereby produce the first scale which could be read correctly by everyone and could not be read incorrectly by anyone. The old scale, with the reading line standing back from the chart, showed one weight to a tall clerk and another weight to a short clerk. The new scale shows the correct weight to everyone without effort or eye strain.

Again the maximum number of prices per pound which we had ever been able to print on the paper charts

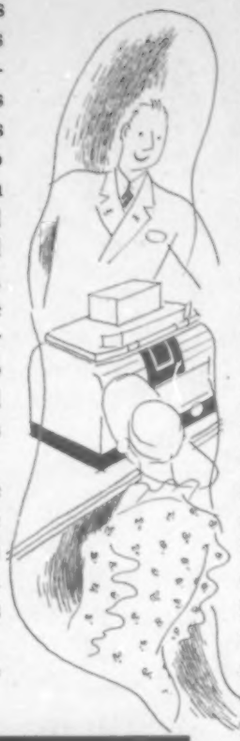


The grocer's view shows weight and price magnified for easy reading

was 43. So we had been forced to eliminate many prices per pound. There was never a column on such charts showing costs at 19c a pound, for example. The merchant was compelled to calculate in his head if he was weighing out an article sold at 19c. Many other prices had to be omitted, and we had always selected those to be omitted on a general, vague theory that certain prices were not much used. But, thoroughly skeptical of all established ideas by now, we made a national survey of this question. We collected 30,000 weighings, or drafts, from food stores, and found to our surprise that less than 4% ran over 5 lbs. This was news. For thirty years we had been making scales to weigh up to 30 lbs., leaving out many necessary price columns, and printing graduations so close together that there was constant chance of error in reading.

So we built a machine to weigh up to 18 lbs. to take care of the annual Thanksgiving weighing. In it we installed a new chart, of special aluminum alloys with more price columns than such a scale had ever had before. In two years, this scale has become accepted as standard in the meat and grocery field.

Meanwhile, in collaboration with the Bausch & Lomb Optical Company, we tackled the possibility of improving the lens on the scale. The result is a highly ingenious device which enabled us to double the number of columns of prices per pound on the chart. The number of digits on the old chart had been 45,000 and hard enough to read they were. The number on the new chart is 95,000 and the one the merchant needs to read at the moment of weighing stands out large and clear. In these two sentences is concealed a Herculean task, for five years of study and experiment were gone through before we could design a machine to make such charts within the strict tolerances allowed by law, and $30,000 were put into it. But the machine as finally evolved can produce such charts in 24 hours, as contrasted with the 900 hours which would be required by the old method. Further the new machine can make no errors; if it prints at all it prints correctly.



The customer's view shows exact weight of every purchase

Our research expeditions were now returning from all out-lying sectors, each one bringing its triumph and its victory. New parts, new efficiency, were ready for the new scale. What, in the meantime, had been happening in the Plaskon sector?

In view of all the forthcoming changes, we knew that the scale must be redesigned in appearance, and we retained the services of Van Doren & Rideout, leaders in industrial design. When the final design was completed, we realized clearly that the mold probably would be the largest one in this country. No press existed large enough to produce this piece. Very well, the press must be built. Again we resorted to the Plastics Department, General Electric Company, who in collaboration with the French Oil Mill Machinery Company in Piqua, Ohio, designed a giant plastic molding press. It stands today in the G. E. Plastics Department factory, 30 feet high, operated by 9 hydraulic rams, one of them 36 inches in diameter, capable of applying a pressure of 3,000,000 pounds. This may safely be considered a press. The mold is one of the largest yet produced. It weighs 7 tons; yet the molded part produced by the mold weighs less than 9 pounds.

This story started with the simple desire of a manufacturing company to

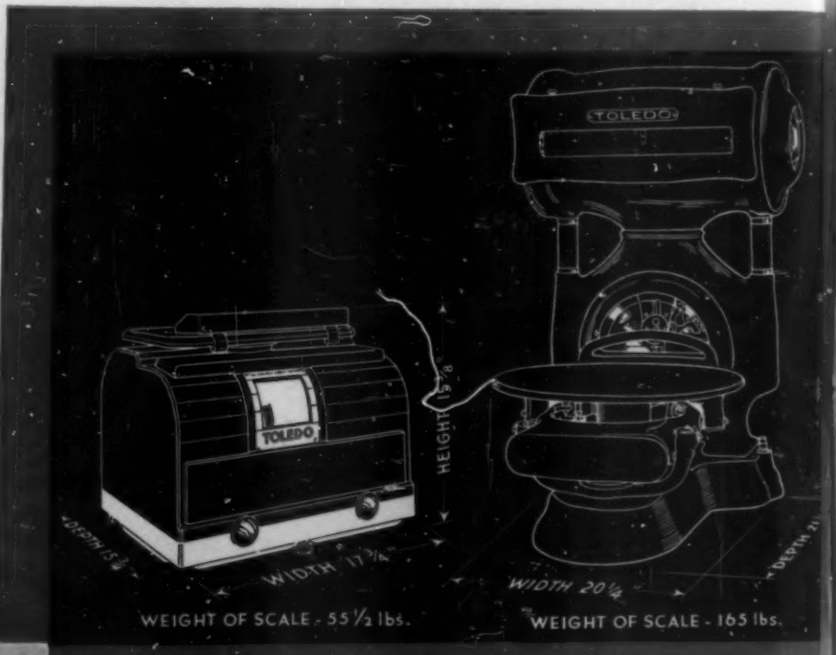
find some better way of making its product. As it has progressed, it has shattered precedent and blazed new trails in diverse directions. In the production of the mold, for instance, it was found that there was only one heat-treating furnace in the United States big enough to carry so large a piece. At that point, the General Electric Company joined efforts with August Lindberg whose life has been devoted to studying steel hardening. Mr. Lindberg and the G. E. Plastics Department experts stayed on the job for 84 hours while the surface of the mold hardened. It had been heated to nearly 3000 degrees Fahrenheit and to cool it, it was dipped in a bath of 10,000 gallons of oil. The oil instantly burst into flame.

When this mold was installed in the press, it still remained for the experts of Toledo Synthetic Products, Inc., to perfect the technique for handling such large pieces. This they have finally done.

In the scale, the structural members are aluminum. Aluminum costs 40 cents a pound. Iron, its predecessor, costs 4 cents a pound. One can hardly compare the Plaskon with the porcelain, because the porcelain is a finish, whereas the Plaskon is in itself a complete material finish and all. Plaskon, as raw material before molding, costs 35 cents a pound. Obviously, we were trying to make a scale out of far more expensive materials. Was this possible, without far more expense?

It was. The old scale weighed 165 pounds, the Plaskon scale weighs 55½ pounds. The customer's demand for lighter scales are satisfied. Less than 3% of the total cost of the new housing is for direct labor. The finish is as thick as the Plaskon housing itself, so there will be no chipping off of finish and exposure of basic metal. And the by-product improvements—the new chart, the new lenses, the new design—these were brought about by the venture into Plaskon. Not only one new field was opened by this venture—but many new fields are opened. The scale business actually has been revolutionized.

Long established mined or refined natural substances have been topped by synthetic materials. Molding has



Plastic and redesign cut the weight of the packaged scale from 205 lbs. to 80 lbs. A corrugated box has replaced the heavy wooden case for shipping.

reduced not only the weight of the scale but it has reduced costs of labor and shipping as well. The housing of the new Toledo Plaskon Scale comes from a mold that is polished and lapped to give a mirror bright surface that is incidental without additional labor. Shipping costs are reduced two-thirds and while the old scale required a specially built wooden case to see it safely through its journey, the new one slips quickly into an inexpensive corrugated carton which gives ample protection at a fraction of the former cost.

Nine years of time, half a million dollars, and many years of the services of hundreds of experts went into the creation of the Plaskon Duplex Scale. The resources of six great companies were devoted to it. As a by-product, a new industry appears, indirectly giving employment to some 2500 men. But it was not for such purposes that the Toledo Scale Company undertook the original search. We started out to improve, and if possible, to perfect a manufactured product.

BIGGER BETTER BUBBLES

MASS production, which has contributed so much to the growth and prosperity of our nation is now brought within the tiny grasp of our younger generation to pleasantly occupy its spare time. Even soap bubbles can be blown in intriguing groups like great clusters of grapes with these new Bubble Pipes introduced recently by the toy division of Waterbury Button Company, Waterbury, Conn.

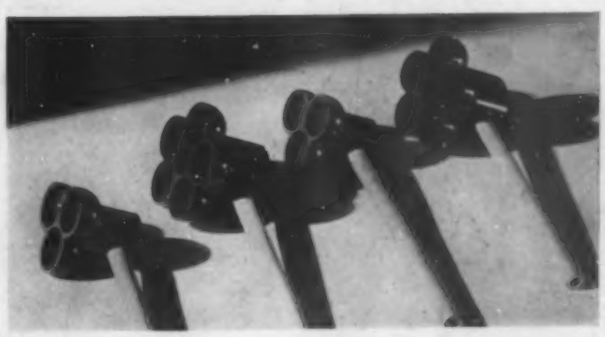
There are two styles. One blows three bubbles at a time, the other blows a cluster of six—an achievement that happened but once in a lifetime—and then, only by accident, with the old clay pipe. These new pipes are much nicer to play with, too, and cleaner. The bowls are of molded phenolic compound in permanent red, green, and blue to enhance the gay colors of huge bubbles, and these pipes do not break if they are dropped or treated roughly. Stems are of American reed which is not unkind to growing teeth and the sanitary get up of the whole affair should have ample appeal to careful parents.

They are attractively packaged in four groups to retail at varying prices. The five-cent three-bubble pipe is mounted 12 on a display card, appropriately lithographed with easel back. Weight per gross packed is but 7 lbs. due to the lightness of molded material—an important factor in price merchandise for national distribution. Small shipments by parcel post or express quietly but surely eat away profits where heavy shipping containers are required for the protection of more fragile goods.

The ten-cent set consists of one three-bubble pipe, one cake of bubble soap, and one enameled soap dish in an attractive display box complete for action. The twenty-five cent size includes a six-bubble pipe and is also boxed with an added cake of bubble soap molded in the form of a fish and a vial of bubble soap chips. The fifty-cent size is of party dimensions and includes a six-bubble pipe, 2 three-bubble pipes, 2 enameled soap dishes, 2 vials of bubble soap chips, and a bubble soap dish.

Truly, a modern toy with both practical and price appeal which demonstrates again the versatility of molded plastics in modern merchandising.

Credit to the Bakelite Corporation for the molding compound.



New things this month

1. The moth-proofing crystalator on the Scott & Fetzer sanitation system is molded of red transparent Tenite. This crystalator formerly was made of aluminum. Photo, courtesy Tennessee Eastman Corp.

2. This sick-call assembly is molded of Durez by Closure Service Co. Partitions to hold candles, bases, holy-water bottle and crucifix are molded in and the cover is hinged to make a complete case when closed. Photo, courtesy General Plastics, Inc.

3. Premier Products, Inc., have announced their new "Dermasage" beauty aid. This massaging device weighs only four ounces. There is nothing to get out of order and the equipment never requires oiling or adjusting. The "Dermasage" is encased in molded Bakelite in a variety of colors. Photo, courtesy Bakelite Corp.

4. For precision timing the new all electric interval timer, made by Measured Time, Inc., fulfills chemical and engineering requirements. The large diameter interval measures time from one to one hundred and twenty minutes, while the clock has a large, red second hand to indicate clearly the fractions of a minute. The black case of Bakelite molded is acid resistant and dielectric. Measured Time has a clear-toned buzzer which may be adjusted loud or soft, long or short. Photo, courtesy Bakelite Corp.

5. "Beauty Box" is the name of this luxurious vanity by D. Lisner & Co., N. Y. It is an American copy of the Italian Tortoise Shell original. The vanity is made in amber yellow or black onyx cast resinoid and provides space for make-up and cigarettes—though small enough to fit in purse. Photo, courtesy Bakelite Corp.

6. A tiny "Nite Guide" made by the Eagle Electric Manufacturing Company is ideal for baby's bedroom, or dark hallways. The amount of light emitted by the small bulb may be adjusted by a movable shade. Nite-Guide is a complete, self-contained unit, only 3 inches high. The plug will fit in standard socket. Bakelite molded is used for both the shade and base. The on-and-off switch allows the lamp to remain in an outlet permanently. Photo, courtesy Bakelite Corp.

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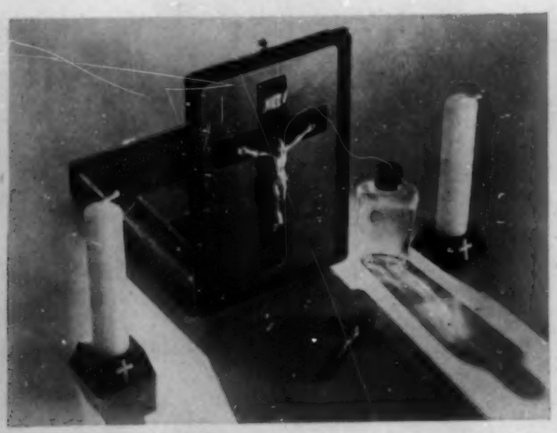

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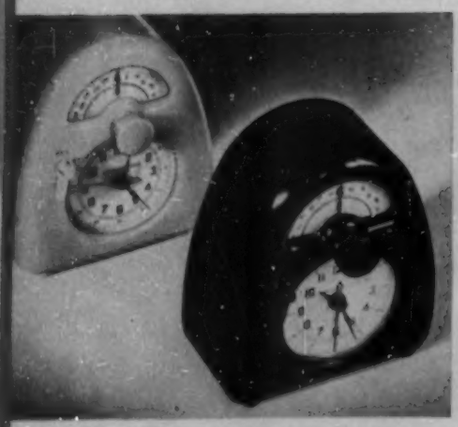

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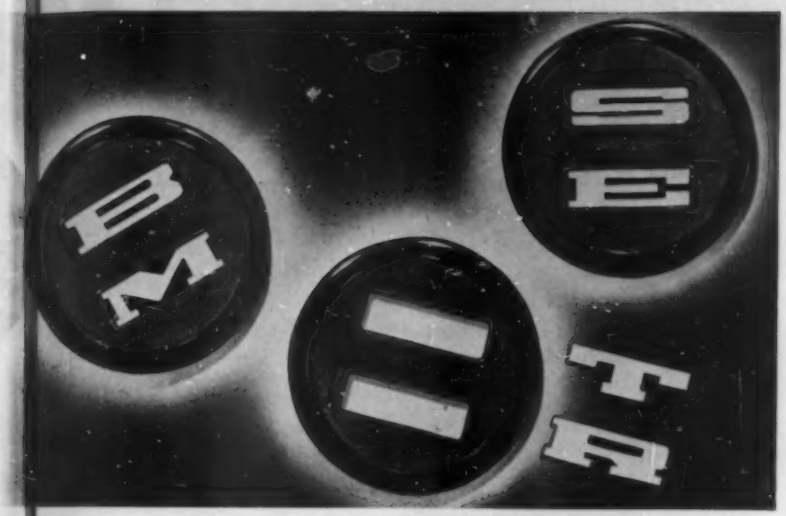
7. The five-year calendar and note pad by General Electric is uncommonly thin and graceful. It was designed and made for their merchandising line of plastic specialties but is available for gifts and premiums as well. Molded of Textolite in ivory, green and red. Photo, courtesy General Electric.

7



8. Personality buttons, pins and belt buckles, with smart "snap-in" initials, have appeared on robes, dresses, pajamas, millinery and coats for fall. Created and patented by Corogram, Inc., both buttons and initials are of urea in contrasting colors. Associated Attleboro Mfrs. molds them of Plaskon. Photo, courtesy Corogram, Inc.

9. Tymit, the new twenty-four hour electric time control provides untold luxuries in the home. Those who habitually fall asleep reading can now be assured that Tymit will turn lights off at a specified hour. This new device can also turn the radio on or off automatically, or it can be used to control other electrical appliances in the home. It is made by the Tork Clock Company, Inc., with a modern case of Bakelite molded in either jet black or walnut. Photo, courtesy Bakelite Corp.

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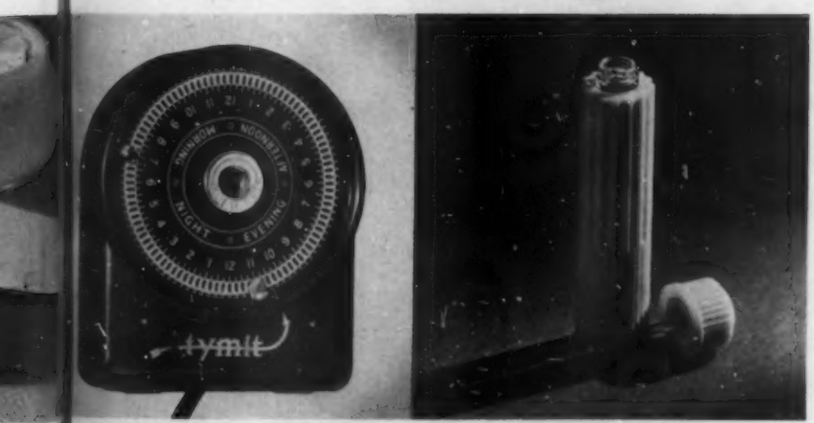


10. Coty's new "Stowaway" purse package for perfume. The fluted case is white urea and the urea closure screws directly onto an enclosed glass vial. A glass applicator is integral with the fluted closure. Beside white, there are pastel colors.

11. The Boyle Velometer is used for measuring the velocity of air in heating and ventilating work. This device is housed in a phenolic case in order to get light weight and a permanent finish. It is sturdily constructed to withstand rough usage. Molded of Durez by Illinois Testing Laboratories, Inc. Photo, courtesy General Plastics, Inc.

11 12

12. Among the many recent home and office devices to make use of molded plastic cases is the new Humidither, a combination thermometer and humidity indicator made by Rochester Manufacturing Co. The case is molded of black Durez and is set off by the chromium plated metal bezel, and the severe shape of the molded case is relieved by the classic curves of the dial aperture. Special semi-gloss finish is obtained on the molded case by treatment after molding. Molded by Diemolding Corporation. Photo, courtesy General Plastics, Inc.

Think it will rain?

Dr. Curry's Weather Forecaster gives the answer. Its sleek case of molded phenolics protects its mechanism, prevents rusting, makes it easy to use and to sell

WHAT makes a manufacturer choose plastics in preference to other materials? Ask an engineer and he will answer, "Because of their fine wearing qualities." Ask the factory production expert and he will report, "Because of the simplicity and low cost of their fabrication." The designer will say, "Because they permit clean, attractive, colorful, eye-appealing shapes and finishes." The merchandiser's answer will be, "Because plastics convey an air of quality which has established a predisposition on the public's part to buy them at prices that yield a profit."

Seemingly, there are diverse opinions on the "reason why," yet you will notice that all of these answers are merely different faces of the same coin—that plastics climb into favor for the very reason that they offer advantages to all those concerned with the production, sale, and use of a product.

In some cases, one or another of these advantages is dominant. Sometimes, however—as in the case of Curry's Weather Forecaster—all of these reasons are combined to form one dominating and compelling reason for plastics adaptation.

Dr. Curry's Weather Forecaster is a device first produced and marketed in Europe where over half a million have been sold to sportsmen, aviators, yachtsmen, farmers and others interested in the out-of-doors. Named after its inventor, Dr. Manfred Curry, the device consists of a hygrometer—with a chemical material which indicates the degree of moisture in the air by change of color—a compass by means of which the wind direction may be determined, and a case which houses and permits the adjustment of these two. Since the degree of humidity (or moisture content of the air) and the direction of the wind are the determining factors in any short range weather prediction, this weather forecaster permits accurate prediction for from eight to fifteen hours in advance, by correlating these two factors. In operation, the device is extremely simple. A turn of the knob, a second adjustment for wind direction and the forecast appears in type, on a small window in the housing.

Having heard that the American rights to this device might be secured, C. S. Hammond and Company, makers of atlases, maps and globes, decided that it would be an ideal item from many angles, to add to their line. It was a device that would naturally be sold through channels identical to those the company was already operating in. In addition, Hammond's older lines tended to experience a seasonal slackening of demand during the summer months—the very season in which the greatest demand existed for reliable weather predictions among all outdoor enthusiasts.

The problem then arose of designing the instrument for the American market. These instruments sold abroad, were housed in cast aluminum. "We thought," writes A. L. Pattee of the Hammond organization, "that the North American edition should be dressed up a little more, but at the very beginning, were undecided as to whether metal or plastics would be used. The question of price eventually decided this because a *comparison of metal costs with what we could get for the instrument made of metal did not appear favorable.* We next investigated the manufacturing cost of plastics which seemed to lend itself to an ideal set-up."

Note that plastics were not chosen because of a lower manufacturing cost than (*Continued on page 54*)

Kadette radio grilles molded of TENITE by Chicago Molded Products Corporation

TENITE

gives these tiny Kadette radio grilles the beautiful luster and coloring of cut jewels, while its extraordinary toughness insures the delicate openwork design against breakage. Unexcelled in strength and color range, Tenite is the ideal plastic for many industrial and decorative uses. Write today for samples and booklet.

TENNESSEE EASTMAN CORPORATION *(Subsidiary of Eastman Kodak Co.),* **KINGSPORT, TENN.**

New ideas

● Molded insulation, for parts of electrical apparatus, is now made in sheet form or in any desired molded shape from thermoplastic materials having excellent electrical and physical properties which may be varied according to the intended use. The thermoplastic substance may be, for example, a cellulose ester or a resin of the vinyl type; it is ground to a state of extreme fineness in a colloid mill in which the rotor and the stator are closely spaced and are both faced with an abrasive such as emery or carborundum. The thermoplastic may be ground either by itself or with other plastics or with pigments and fillers which are selected to improve appearance or to impart desired properties to the final product. (British Celanese, Ltd., British Patent 428,456.)

● A recent improvement in silent gears provides a soft rubber bushing between the hub and the outer part of the gear; This gives greater elasticity, and hence less noise and vibration, than the older types of silent gear. The invention is based on a newly developed method for effecting strong adhesion between rubber and synthetic resins; other important applications are expected to follow. (*Kunststoffe*, August, p. 203.)

Among the many novel exhibits at the Autumn Trade Fair in Leipzig will be a toothbrush, attractively executed in celluloid, which stands alone and so eliminates the need for a stand or holder. Some new ideas in tableware, with effective combinations of glass and synthetic resins, will also be shown, examples being salt and pepper shaker sets, napkin rings and other specialties. (*Kunststoffe*, August, p. 201.)

● Molded plastic shapes could be successfully used in the structural parts of airplane wings, according to calculations in which the dynamic load is treated as an impact and ample allowance is made for the maximum dynamic load which may be encountered in flying. The dynamic load (stress imposed by sudden changes in speed or direction) may be expected to be several times as large as the static load (supported weight of plane and cargo); various synthetic resin products are known to have ample strength to bear their share of the static load if used in airplane wings, but the ability to withstand the sudden dynamic stresses has not hitherto been so certain. Based on these calculations which show sufficient strength, various suggestions are put forth for the replacement of wood or metal parts in airplane wings with molded or laminated resin parts. (Otto Pabst, *Plastische Massen*, August, pp. 217–220.)

● The principal obstacle to replacement of bronze and white metal by synthetic resins in bearings has been the extremely low heat conductivity of the resins; that is, the metal bearings can carry away the frictional heat rapidly enough to prevent overheating, while the molded bearings cannot. But this drawback is largely, and in some cases adequately, compensated by the very superior frictional relations of the molded bearings, which can run "dry" (without grease) much better than a metal bearing. Thus, when there is efficient air cooling or when the operating load is low, molded bearings can give excellent service, and their advantage becomes all the greater if the lubrication is neglected or fails for any reason. Thus the field is not entirely closed to plastic products; and there remains the further possibility that a plastic material with greatly increased heat conductivity may be developed; bearings made from such a plastic could compete directly with metal bearings, since synthetic resins have mechanical properties which are intermediate between those of white metal and bronze, and are quite adequate for all except severe service uses of bearings. (Paul Wiessner, *Plastische Massen*, August, pp. 226–227.)

● Piston rings are now produced economically from fibrous synthetic resin compositions by compounding the resin with the fiber in an initial stage of resin formation, forming rods or strips of the composition, placing these in a cylinder or around a mandrel, and curing the resin by the usual heat treatment. (Allgemeine Elektrizitäts-Gesellschaft, German Patent 613,320.)

● A superior method for making molded abrasive disks is to dissolve a phenolic resin in cyclohexanone or cyclohexanol or cyclohexanol acetate, compound the solution with the abrasive powder, and convert the resin to the B state, in which it is infusible but still retains its thermoplasticity. The molded shapes may then be produced by cold molding or by hot pressing, according to circumstances. (Bakelite-Gesellschaft, German Patent 613,051.)

A combined bottle cap and brush applicator, for liquid cosmetics or other materials which can be applied with a brush, has the cap molded with the necessary inside threading, and with a central nib which is an integral part of the molded cap. The brush is fitted to this nib by means of hollow shaft. A watertight gasket surrounds the base of the nib, and a washer or the brush shaft presses the shaft against the nib and the gasket against the cap, thus making a tight union. (Carl J. Nagl and Bart E. Scanlon, Northam Warren Corp., U. S. Patent 2,009,899.)

● Ornamental handlegrips are applied to golf clubs and other shafts by winding on the shaft a flat strip of celluloid or other plastic cellulose derivative and wrapping this winding in another layer of like material, then integrally uniting the first winding with the wrapping layer. By using strips of colored or decorated plastic, ornamental effects are obtained. (Wm. C. Hampton, Crawford, McGregor and Canby Co., U. S. Patent 2,009,969.)

● A new self-locking lamp socket casing is molded from insulating material, with projections symmetrically spaced around the periphery of the casing at the top, and with a slot extending downward a short distance into the casing, then radially for a sufficient distance to form a tongue which can be flexed. This tongue bears a locking projection which is unsymmetrically spaced with respect to the other projections, in such a way that the casing locks in position when the lamp is attached. (Wm. C. Tregoning, Cutler-Hammer, Inc., U. S. Patent 2,008,777.)

● Applicators for underarm deodorants must do more than present a perfectly smooth surface where contact may be made with the skin of the user; they must also protect the skin from contact with the glass bottle neck, which may have burs, chipped spots or other dangerous irregularities. This need is met by a new applicator of phenolic resin; it is molded with a skirt which projects down over the bottle neck. This applicator is also unusually efficient by reason of having small suction pockets molded in its face, adjacent to the discharge openings. (Edward E. Kallenbach, Richard Hudnut, Ltd., Canadian Patent 352,358.)

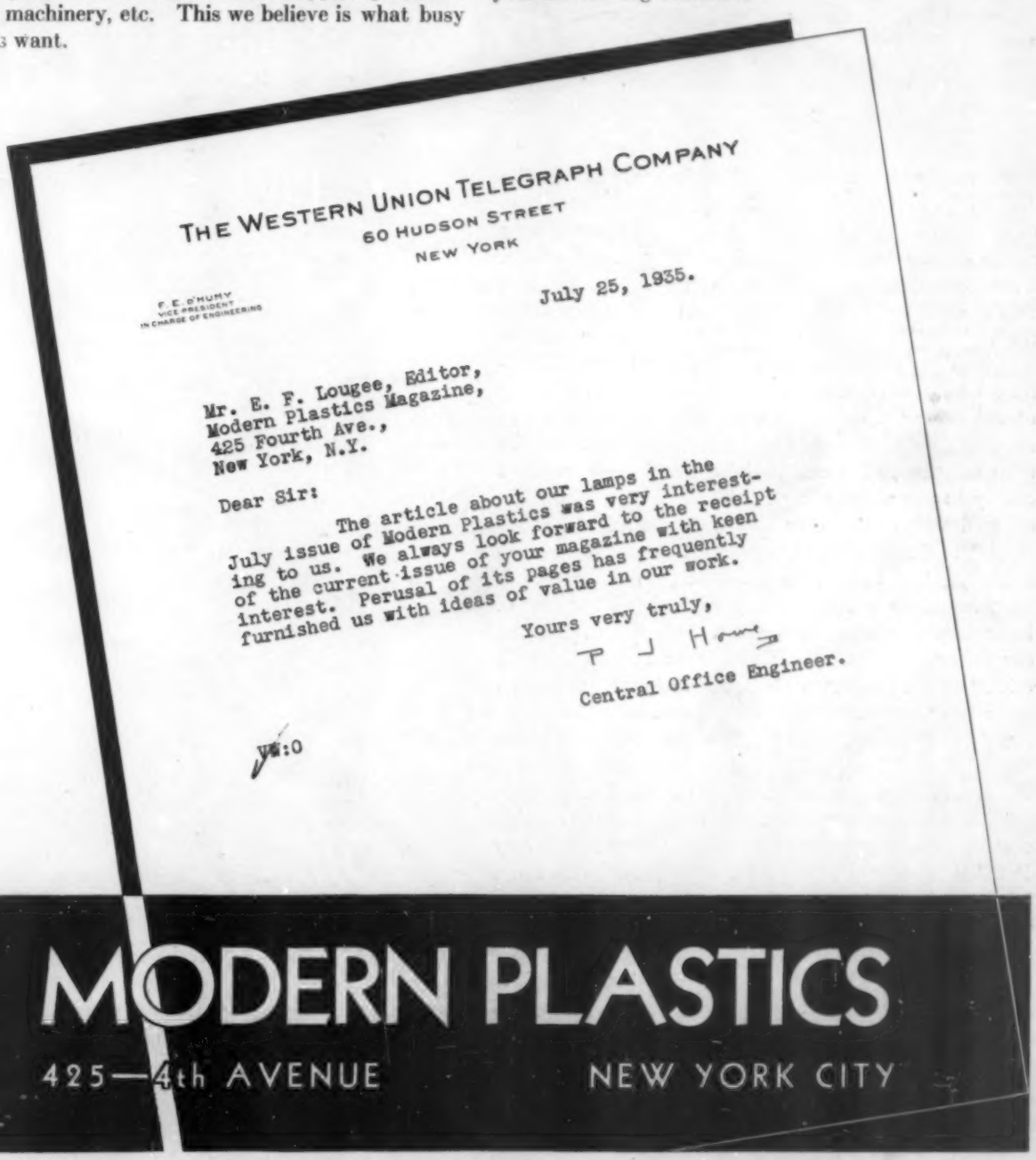
IN WHICH WE ARE HELPFUL
TO BUSY WESTERN UNION ENGINEERS

MODERN PLASTICS is deeply gratified by this friendly expression of Western Union Engineers. Busy technicians for a national public service, their appreciation of our publication is a stimulus to greater efforts in making MODERN PLASTICS more informative, interesting and useful.

During its short span of existence, MODERN PLASTICS has worked to present news of the plastics industry conveniently focused; articles on plastic technique and technical progress; data on sources of supply, specialized services, machinery, etc. This we believe is what busy engineers want.

Because of the naturally expanding character of the industry, advertising in MODERN PLASTICS is news. Treating advertising as news for those advertisers requiring our service makes their advertising profitable. Because of proximity to vital news about the industry other advertisers find MODERN PLASTICS equally valuable.

If you want to reach the plastics industry with your sales message you will need MODERN PLASTICS in your advertising schedule.



THE WESTERN UNION TELEGRAPH COMPANY
60 HUDSON STREET
NEW YORK

F. E. D'HUMY
VICE-PRESIDENT
IN CHARGE OF ENGINEERING

July 25, 1935.

Mr. E. F. Lougee, Editor,
Modern Plastics Magazine,
425 Fourth Ave.,
New York, N.Y.

Dear Sir:

The article about our lamps in the July issue of Modern Plastics was very interesting to us. We always look forward to the receipt of the current issue of your magazine with keen interest. Perusal of its pages has frequently furnished us with ideas of value in our work.

Yours very truly,

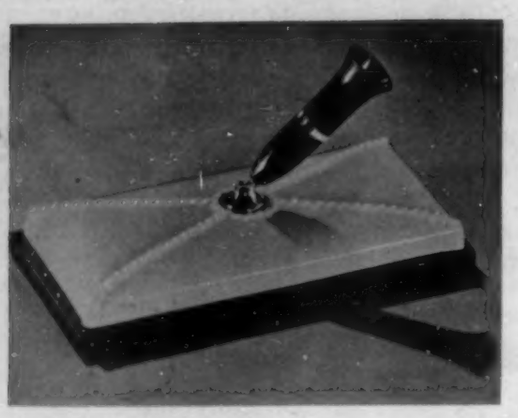
P J Howe

Central Office Engineer.

VH:O

MODERN PLASTICS
425—4th AVENUE NEW YORK CITY

Sheaffer redesigns desk sets



IN keeping with present standards of living, the W. A. Sheaffer Pen Company, has redesigned its entire line of famous desk sets. Furthermore, new materials are being employed in their manufacture. This line, consisting of more than fifty distinct models, was created by Thomas Tibbs, industrial design engineer.

Before any attempt was made to redesign the Sheaffer models, Mr. Tibbs undertook an exhaustive study of all modern materials which might be used in the manufacture of the desk sets. Heretofore, materials used for pen and pencil desk sets had been confined chiefly to Onyx and other marbles, but Mr. Tibbs discovered that many other fine materials might be employed, and were better adaptable to present day standards. Among these, colorful cast phenolic resinoids were found to be particularly well suited because of their easy machining properties, true colors, texture, excellent finish, and their ability to harmonize with other types of materials. This last factor was of utmost importance in creating the new designs. Cast resinoids could be combined with white china to produce one effect, or could be used in combination with gleaming metal and wood, to give only two examples.

"When I started out to determine the most suitable material," says Mr. Tibbs, "I found that I had a very long list from which to choose. After a careful study, however, I was able to reduce this list considerably and soon decided that cast resinoids would be used for the majority of the new items."

To conform with Sheaffer's traditional conservatism, colors were restricted to ivory white, brown, green, and lustrous black.

Space does not permit a detailed description of each design in this varied line of modern desk sets. In one instance, however, a rectangular single white china top has been combined with a brown cast resinoid base, and a brown pen socket to match. In another, a lustrous black cast resinoid base with rounded ends is used with two chromium discs, and a chromium plate underneath. A third is made with a green and white cast resinoid disc in combination with a gold plated base, and a gold flower design around the side. All finishing of the cast resinoid bases is being done by National Insulations Company, Chicago. The cast resinoids used are made by the Bakelite Corporation.

DESIGN

DESIGNED BY NORMAN BEL GEDDES & COMPANY
TELEPHONE INDICATOR FOR BATES MANUFACTURING COMPANY
MOLDED BY MACK MOLDING CO., WAYNE, N. J.
UNYTE COLOR GREEN L-326

UNYTE
REG. U.S. PAT. OFF.
MOLDING COMPOUNDS

UNYTE CORPORATION
521 FIFTH AVENUE, NEW YORK CITY

Keeping posted

Houses, Incorporated

For the prime purpose of cooperating in the encouragement of house building of all worthy types, the General Electric Company has organized a separate company known as Houses, Incorporated, it was announced recently in a joint statement by Gerard Swope, president, and Owen D. Young, chairman of the board of General Electric. It will be the purpose of Houses, Incorporated, to cooperate with others in the development of houses of any type which seem worthy and promising; to conduct research work; and to assist in the management and financing of such enterprises.

Since it is primarily concerned with the interior mechanism of the house, the General Electric Company has not been, nor will Houses, Incorporated, be, the proponent of any particular type of construction enclosure, it was announced, whether it be prefabricated, partly prefabricated, or the traditional enclosure.

To develop a large market for modern homes, the company believes it essential to improve their quality and livableness, to reduce their cost, and to develop methods of extended but safe financing.

"The General Electric Company, believing as it does that this is possible, is endeavoring to make its contribution by developing and standardizing the operating mechanism of the modern home, such as heating, air conditioning, lighting, cooking and refrigerating appliances, dishwashers, laundry machinery, radios, and clocks, and through volume production and installation, substantially reducing the cost and increasing efficiency," the statement concluded.

Metal Plated Plastics

A new method of electro-plating plastics and other non-conductors, far less expensive and more efficient than any previously used "galvanique" process, has been developed. It is not necessary to submit the plastic to chemical treatments—in fact the surface of the average object is rendered a perfect conductor in a fraction of a minute. Philip Sievering Inc. has received an exclusive license for the New York jobbing rights.

The process, representing years of labor by the metallurgist, Hans Schneider, has been largely developed by Morris Sanders, industrial designer. Mr. Sanders, heretofore, has considered the process only in its possibilities upon glass. But it is his intention to eventually grant licenses to plastic molders and converters.

Swann Now Monsanto

Edgar M. Queeny, president of the Monsanto Chemical Company, announces that the name of the Swann Chemical Company, Monsanto subsidiary, with plant at Anniston, Alabama, has been changed to the Monsanto Chemical Company of Alabama. Administrative and sales offices of the Alabama subsidiary, together with those of another former Swann property, the Provident Chemical Company, St. Louis, have been moved to Monsanto's new Administration Building in St. Louis. Sales offices of a third former Swann company, Wilckes, Martin, Wilckes Company, Camden, N. J., have been consolidated with Monsanto's New York office. A new sales division, the Swann Products Division, has been created to handle the sales of all products of the former Swann companies. Henceforth these products will be sold under Monsanto's name. District sales offices are retained at Birmingham, Alabama.

Opportunity in Australia

Roanoid (Aust.) Pty. Ltd., corner of Tope and Bank Streets, South Melbourne, Australia, would like to hear from American plastic manufacturers who might be interested in securing the cooperation of this Company for custom molding in Australia under license or on some other basis. They are also interested in securing catalogs of presses and other equipment essential to the molding and finishing of plastic products. Correspondence should be addressed to Mr. L. F. Pyke, Director, at the above address.

Martin Hoffman with Makalot

Martin Hoffman has joined the staff of the Makalot Corporation. Mr. Hoffman, who has been production manager for Indur molding powders and resins of the Reilly Tar & Chemical Company for the last six and one-half years, was previously employed in the Plastic Department of International Tar & Combustion Company, and prior to that worked with American Cyanamid Company.

Premium Buyers' Round Table

The semi-annual meeting of the Premium Advertising Association of America, Inc. held in conjunction with the Atlantic Coast Premium Exposition will take place September 23 to 27, inclusive, at the Hotel Pennsylvania, New York City, and will include a series of Round Table discussions of timely interest.

Ford Builds Plastic Plant

Construction of a huge mill for making molded automobile parts from soy bean plastics is nearing completion at the Ford River Rouge plant, according to Ford Motor Company officials. The completed mill fully equipped has a projected cost of approximately five million dollars.

The first machine units, including storage tanks, giant mixers and presses, are now in place and are turning out test parts, it was announced. Actual production of parts will be started as soon as the necessary machinery can be installed. Ford plant will use entire production.

F-o-r-e!

The golf committees of the plastics industry appointed recently at Buckwood Inn have taken the matter seriously. W. L. Kelly, Chicago Molded Products, Inc., Chicago, writes that the Western Golfers will meet September 24 at Invernese Country Club at Toledo, Ohio. G. V. Sammet of Northern Industrial Chemical Co., Boston, tells us that plans are afoot (although not completed) for a New England gathering at the Berkshire Hunt Country Club, Lenox, Mass., for early October. And George Scribner, Boonton Molding Co., Boonton, N. J., is inaugurating a return round-up for Buckwood Inn, Delaware Water Gap, about September 25. Announcements will be mailed by these committeemen when plans are entirely completed.

Exposition of Chemical Industry

Diversity and newness will be the keynotes of exhibits at the 15th Exposition of Chemical Industry, which is to be held during the week of December 2 to 7, 1935, at Grand Central Palace, New York City. Not only the exhibits, but the classifications of attendance, will cover the complete range of the reconstruction period's industrial chemical interests.

The Exposition is under the personal direction of Charles F. Roth, manager of the International Exposition Company, with headquarters in Grand Central Palace, New York City. Mr. Roth has directed each Exposition since the first one was organized in 1915.

John P. Case Made President

John P. Case, vice-president of American Record Corporation in charge of the molding division for five years, was recently made president of that organization. He succeeded M. J. Siegel who will continue his connection with the company as chairman of the board of directors and will assume additional duties as an officer of Consolidated Film Industries, Inc., the parent organization.

Sorry!

At the time we wrote about the new Western Union molded call box we were unaware that Auburn Button Works, Inc., had also molded some of the new red handles. The fact is, according to Western Union, as we stated, that Niagara Insul-Bake Co. molds the new call box complete, but previous to this, a considerable quantity of identical handles were molded by Auburn Button Works, Inc., as replacement handles on existing equipment.

UNIFIED RESPONSIBLE CONTROL

Where precision counts as in the recessing and exact location of screw inserts in an electric switch box, the complete facilities of Waterbury Button are most effective.

A non-tangling yarn dispenser also requires complete, unified facilities where every detail is under one responsible supervision from start to finish.

The more exacting your molded plastic requirements, the more reason why you should communicate with us. Write today.

THE WATERBURY BUTTON CO.

PLASTIC DIVISION

EST. 1812

WATERBURY, CONN.

NEW YORK CITY BOSTON PHILADELPHIA ROCHESTER
DETROIT CHICAGO TORONTO

DELICATE
ORGAN KEYS

OR STURDY
VALVE HANDLES

AUBURN MOLDERS
are VERSATILE SPECIALISTS

Whatever your particular problem may be, you can be certain that Auburn engineers will attack it, backed by long experience in the same or similar fields. Auburn molds every type of plastic. Auburn serves every branch of industry. Its large plant is equally well equipped for small quantity, high-precision work or steady, speedy, long run production of standard parts. Before you tackle a molding job . . . arm yourself with Auburn aid and experience. Write, today, to—

Auburn Button Works, Inc.
Auburn, N. Y.
Established 1876

Celluloid Sales Changes

The Celluloid Corporation announces the following changes in its sales department organization.

E. W. Ward is now director of sales of the Protectoid Department, while W. K. Woodruff succeeds Mr. Ward as district manager of the Chicago Office. M. Demarest is sales development engineer of the Protectoid Division and A. J. St. John is advertising manager.

Wrong Number

In a letter from H. S. Spencer, General Plastics Inc., published in MODERN PLASTICS, August issue, page 52, he identifies one of Harry M. Dent's patents as No. 1,917,022. Several of our readers pointed out the error of this number so we wrote to Mr. Spencer about it. "The correct number is 1,917,020," he says with apology to those who were misled.

Invitation Affair

An Industrial Materials Exhibit, sponsored by a group of well-known manufacturers representing a variety of industries, will be held October 21–25, on the Hotel Astor Roof. Among them, The Boonton Molding Co. will display examples of its craftsmanship and the Bakelite Corp. will exhibit examples of modern molded and cast phenolic materials which should interest manufacturers and distributors alike.

Other exhibitors include the Parker-Kalon Corp.; Ericsson Screw Machine Products Co.; Carborundum Co.; Norma-Hoffman Bearings Corp.; Hercules Powder Co.; American Felt Co.; American Hard Rubber Co.; American Steel & Wire Co.; The Brown Co.; Peter A. Frasse & Co.; Gillespie-Rogers-Pyatt Co.; Mt. Vernon Die Casting Co.; Spaulding Fibre Co.; Stackpole Carbon Co.; the Texas Co.; B. D. Drakenfeld Co.; Rawlplug Co.; and Hillman Brass & Copper Co. Since this is an invitation affair, tickets of admission should be secured from any of the above participating manufacturers.

New Non-bleeding Material Announced

Molded plastic parts exposed to acetone and other strong solvents or acids sometimes are subject to bleeding of the dye, and to overcome this, General Plastics has recently brought out a non-bleeding material called 3973 Black. Although originally developed to overcome the bleeding troubles in molded bottle caps in contact with strong solutions, the new material has found many industrial applications. Combined with a low moisture absorption rate of 0.7% (A.S.T.M.) Durez 3973 has a rich high gloss finish and high torsional strength. This non-bleeding quality is recommended for textile machinery parts where any bleeding of the dye under the action of solvents would prove troublesome. It has a compressive strength of 30,000 PSI (A.S.T.M.)

Catalin Granted Injunction in Suit

An injunction was granted Catalin Corporation of America against Cataluzuli Manufacturing Company, Inc., recently, by Judge Clarence G. Galston of the United States District Court, Eastern District of New York, in the patent suit which was won by the Catalin Corporation. In this suit Judge Galston broadly held all patent claims valid and infringed upon by the defendant.

The injunction enjoins the Cataluzlui Company to discontinue manufacturing material under Catalin's patents, and to pay damages as well as cost of the legal proceedings.

On July 31, Nixon Nitration Company signed a consent decree whereby they acknowledge the validity of Catalin patents. They have stopped manufacturing cast resins under those patents, in so far as Catalin did not grant them a license.

Arthur Dehon Little

Dr. Arthur Dehon Little, 71, 5 Maple Street, Brookline, died suddenly Thursday afternoon, August 1, at The Rock End Hotel, Northeast Harbor, Maine, where he was spending the summer with Mrs. Little. He was chairman of the board of Arthur D. Little, Inc. of Cambridge, an internationally known firm of chemists and engineers, which he founded with the late Roger B. Griffin forty-nine years ago.

Dr. Little was born in Boston on December 15, 1863. Besides his wife, formerly Henrietta Rogers Anthony, he leaves a brother, Edward H. Little of Newtonville, and a nephew, Royal Little of Providence, R. I. He was a member of the Class of 1885 of Massachusetts Institute of Technology.

Dr. Little was widely known in his chosen profession and in the business world. He was president of American Chemical Society (1912–14), American Institute of Chemical Engineers (1919), and Society of Chemical Industry (London) (1928–9).

He began his professional work as chemist to the Richmond Paper Co., Rumford, R. I., the first mill in the United States to manufacture wood pulp by the sulphite process. During his long and successful career, he published many articles which were notable not only for their scientific and humane value but for the clear and individual style in which they were written. Among his best known and major literary works were "The Chemistry of Paper-Making" (with R. B. Griffin), "The Handwriting on the Wall," and "The Fifth Estate." His passing represents a distinct loss to the entire plastics industry.

John A. Lyter Dies Suddenly

It is with deepest regret that we report the sudden death of John A. Lyter, advertising manager for the R & H Chemicals Department of E. I. Du Pont de Nemours & Co. John J. Landy has been appointed to take Mr. Lyter's place.

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High Speed
Positive Pressure
Close-coupled

Molding Presses

For maximum production, LOGEMANN high-speed molding presses are unequalled. Quick closing and opening produce high output, without lost time or unnecessary motions.

Full pressure can be positively maintained during "curing." This eliminates spoilage through decreased pressure, and insures pieces that pass the most rigid inspection.

With built-in pump and fluid tank, unit is entirely self-contained. Its compact, close-coupled appearance appeals particularly to users requiring multiple units, but limited as to space.

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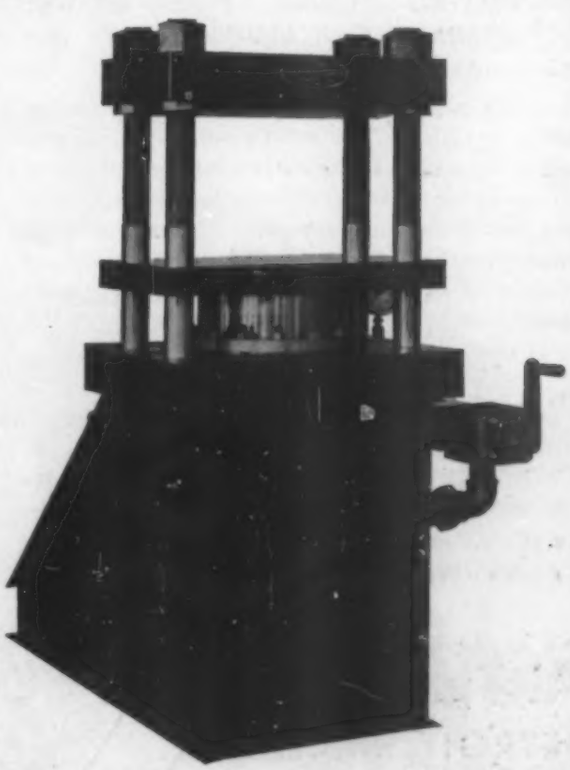

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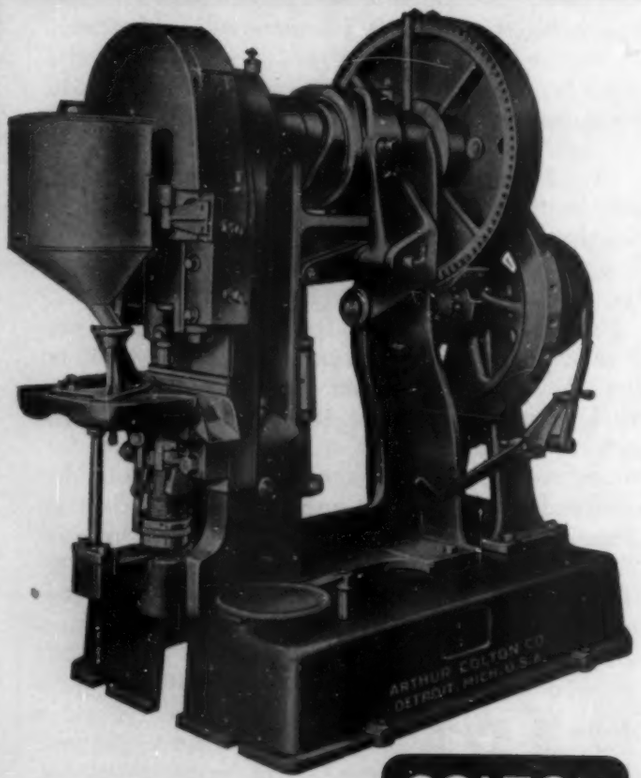
Our products are particularly adapted to the requirements of the Plastics industry

COLTON Preforming Machines have won wide usage because of their inherent sturdiness, their uniform, speedy and satisfactory performance.

Note the new, improved 5½ Tablet Machine shown at right. The solid steel frame insures perfect operation; the improved die fasteners, improved cam construction, heavier ejecting arm brackets and vanadium steel plunger make possible high speeds without fear of breakdown or lowered quality. In every particular, we believe, this machine is by far the finest the market has to offer.

The 5½ Tablet Machine makes tablets up to 3" in diameter and having a fill depth of 2⅛". Other Colton Preforming Machines—single punch, multiple and rotary—are likewise outstanding in construction and performance. Write for literature on these machines or have our engineers visit your plant—



ARTHUR COLTON CO.
DETROIT, MICHIGAN

COLTON
DETROIT

new machinery

Cut-off Machine for Cast Resins

A new cutting-off machine for cast plastics which embodies several unique and interesting features has been designed and built by the White Engineering Laboratories Inc., Paterson, N. J. It cuts rods, bars and tubes quickly and accurately with clean, smooth parallel cuts and a minimum of waste and finishing. There is a micrometer stop gage for regulating the exact thickness of the cut-off piece. One or several cutting wheels may be used on the wheel spindle and provision is made for the quick interchange to various work-holding and gaging devices. The motion of the wheel spindle is exceedingly sensitive and it is easily controlled by the operator seated at the machine.

There is a work receptacle underneath the machine with a water drain so arranged that work can be immediately removed while the machine is in operation. Either direct motor or countershaft drive may be employed with endless belts and the tension may be regulated with an easily accessible screw tensioning device. Accessories for the machine include foot operation and automatic water shut-off when the wheel spindle is raised out of its cutting position.

A fixture seating feature is so designed that a specially constructed device for pearl cutting is quickly placed. Either of two arm balancing features, a spring resistance or a counterweight, may be employed at the user's option. The general "ensemble" of the machine presents a sturdy, pleasing and satisfactory appearance.

Hydraulic Molding Presses

Mechanical or hydraulic platen pull-backs and devices to operate piece-ejection mechanisms are built-in units in the Logemann hydraulic molding press, whose flexibility of design permits building to suit individual requirements. Platen dimensions and strokes can conform to mold sizes; pressures can conform to character of material and size of pieces. Platen clearance is adjustable and when down-stroke, instead of the usual up-stroke is desirable, the press can be built accordingly by Logemann Bros. Co., Milwaukee.

Press platens are positively guided at all points of the stroke for accuracy—bronze bushings assure this. The press is compact, occupying but small floor space, and each unit is entirely self-contained. Logemann presses are designed and built by a concern with more than fifty years of experience and an equally long established reputation for quality workmanship. Molders interested will be mailed one of the new folders describing Logemann hydraulic molding presses.

BARCO SWIVEL JOINTS ON BATTERY CONTAINER PRESSES

PRODUCTION GOES UP when BARCO JOINTS GO IN

Swivel 7S-8CS

Swivel 7S-8BS

Swivel 7AS-8CS

Swivel 7AS-8BS

Barco Swivel Joints provide the flexibility for steam lines on molds, heaters and presses, which speeds up production without loss of time.

Because they do not leak with alternating cold and heat . . . because they give leak-proof dependability from day to day . . . because gaskets do not blow out . . . and because their continuous operation contributes steadily to profits, leading manufacturers standardize on Barco Swivel Joints.

Send for Catalog 254.

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BARCO Swivel JOINTS

MAKALOT----It Simply MUST Be Good!

Our growth is not much of a puzzle to us. The fact that our business volume is more than three times that of last year, which was double that of the preceding year, tells us that Makalot plastic compounds are what the market likes. It also places a responsibility on us to keep up the high quality. And we will.

Sure Results

You buy any resin for results. You think of a finished plastic product. Makalot assures you the finished product exactly as you want it. We compound the resin to insure the desired result.

Economy in Processing

Makalot flows better, cures quicker and does not stick nor stain. You save shop time and make your deliveries on the dot. Beautiful smooth finish requires little extra handling. Works well in the largest as well as smaller moldings.

Special Attention to Special Problems

Many organizations have seen our claims of better results, greater economies and faster production in these columns. They have shot problem after problem at us. They have tested Makalot practically. We invite you to do the same. There is a Makalot compound exactly right for your requirements. It costs you nothing to find out. So write today. We'll conserve your time by giving you what you want.

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Diethyl Phthalate
Dimethyl Phthalate
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Triphenyl Phosphate
Santolites (Synthetic resins)
Phenol
Phthalic Anhydride
Maleic Anhydride
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Butyl Acetate
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Included in the Monsanto list are products that find an increasingly wide application in America's major industries. An opportunity to furnish service data and discuss your present or potential requirements will be appreciated. Such discussions are often mutually advantageous.

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New York • Boston • Chicago • San Francisco • Montreal

Chemicals

Literature

Metallic Soaps

A booklet, "Metallic Soaps—Their Uses and Properties," has been prepared by the technical sales department and Francis J. Licata, chief chemist, of the Metasap Chemical Company. It embraces a comprehensive explanation of what metallic soaps are, together with their methods of manufacture, chemical and physical properties, methods of analysis and applications in various industries.

We are given to understand that this publication is the only one of its kind in the English language and we therefore feel that it should be of interest to many of our readers. The book is of 40 pages, illustrated and supplemented with photographs and charts.

Industrial Thermometers

A new Industrial Thermometer Catalog has just been issued by the C. J. Tagliabue Mfg. Co. The catalog (No. 1125) contains 24 pages of conveniently arranged listings of the complete TAG Line of Industrial Thermometers, Miscellaneous Metal and Woodback Thermometers, Hygrometers, U Gages, Mercurial Vacuum Gages and Mercurial Barometers.

Symposium on Paint and Paint Materials

This symposium was sponsored by A.S.T.M. Committee D-1 on Preservative Coatings. The fifteen technical papers included cover almost all phases of the paint, varnish and lacquer industry. The subjects covered by the various papers are treated in a comprehensive technical manner. Each of the authors, an outstanding technologist in his field, prepared his paper from a broad viewpoint and the information and data presented are of particular interest to the consumer as well as those concerned with production.

After a "Look into the Future" there is a paper dealing with the preparation, use and abuse of specifications, followed by discussion of protective and decorative coatings for railway passenger car equipment. Paint, varnish and lacquer testing are described and extensive papers follow on drying oils, zinc, lead and titanium pigments, mineral earth colors and synthetic iron oxides and chemical colors. Natural and synthetic resins; lacquer solvents and volatile thinners; and turpentine and petroleum distillates as thinners for varnish and paint, are covered in the remaining three papers. Copies of the Symposium on Paint and Paint Materials, 150 pages, can be obtained from A.S.T.M. Headquarters, 260 S. Broad St., Philadelphia, at $1.50 cloth binding, $1.25 paper cover.

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. . . large size, with freedom from warpage . . . delicate detail, with close tolerances on large overall dimensions . . . requiring precision molding, for accuracy and uniformity; demanding careful attention to plastic material properties, for durability and dependability. On all counts, American Record Corporation molding has what it takes to make plastic parts outstandingly successful for all purposes.

Electric Hair Drying Machine Part
Molded in One Piece—14" in Diameter

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RESIN DYES

Literature

PLASTISCHE MASSEN (PLASTIC MATERIALS)

By Dr.-Ing. Arthur Sommerfeld
Verlag von Julius Springer, Berlin, Price 28 RM

The book is the outcome of 25 years' practice in the production of plastic substances and the study of the extensive literature pertaining to the subject, and the author states that the text has gradually developed side by side with industrial work. The book is divided into three parts, the first dealing with plastic substances as a whole, the second part relative to plastics in general and their raw materials, and the third part describing the methods of testing the finished plastics. Admittedly, the author has taken a very catholic view of what constitutes a plastic material, for he includes, in addition to well-known examples such as resins, rubber, bituminous substances, cellulose derivatives, also cement, clay and glass. Such a wide survey has necessarily involved considerable condensation in many chapters, so as to keep all such information within the limit of 348 pages. Brief historical remarks introduce the various chapters. The exhaustive chapters dealing with the testing of materials we find particularly interesting, for the standardization of products is one of the great problems facing the plastics industry.

Lumarith Lamp Shades

A booklet "Lumarith Lamp Shades" issued by the Celluloid Corporation clearly defines the practical and desirable qualities of Lumarith as a lamp shade material. It contains a brief outline of the history of Lumarith and a comprehensive list of the principal reasons for its prompt acceptance by the public.

Buffing and Polishing Methods

Published by the Lea Mfg. Co.
Price $1.00

This is a ninety-six page Reference Book and Instruction Manual containing a complete description of the Lea methods of buffing and polishing plastics and metals. About one hundred different methods are described in detail.

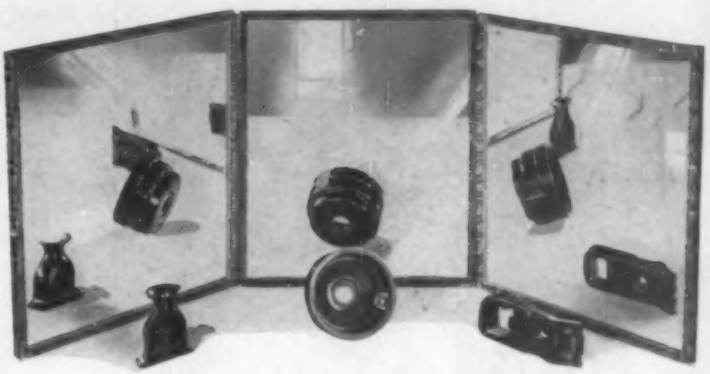
Motor Maintenance

The Ohio Carbon Co. announces that the demand for its recently-issued booklet, "The Brush Phase of Motor Maintenance," has necessitated a new edition, now ready. It has been brought up to date by a series of illustrations showing the Company's testing system for maintaining its standards of quality; and some additions and changes have also been made in the test matter.

Worthwhile Reflections—

Consider

Stokes *Plastics*



Our staff of molding specialists freely offers you their services in discovering ways in which Stokes Plastics may be of use to you. If other methods seem to be inadequate

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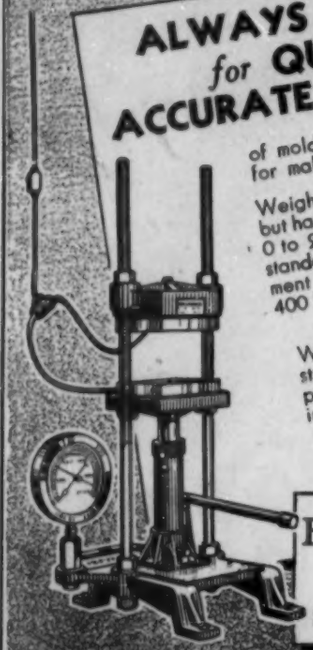
Weighs only 125 pounds but has a load range from 0 to 20,000 pounds—Its standard hot plate equipment gives you heat to 400 F.

Write for the whole story of this big, little press—There is nothing like it—



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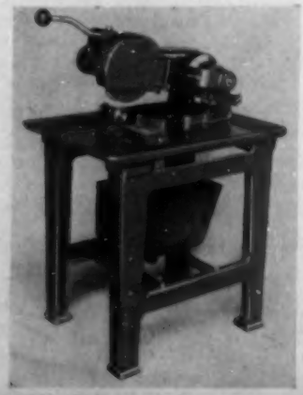
WHITE CUT-OFF MACHINE
for plastic rods and bars

The White Cut Off Machine embodies the latest scientific advance in rapid, clean economical cutting off of plastic rods and bars. Simple and easy to use. Quickly convertible to either motor driven direct belt or countershaft drives. Belt tension easily regulated by an accessible screw tension device. Micrometer thickness stop gage. Spindle allows for single or combination wheels. Quick interchange to various work holding and gaging devices. Work receptacle with water drain under machine instantly removable even with machine in operation. Automatic water shut off operates when spindle is raised out of cutting position. Write for details.



WHITE ENGINEERING LABORATORIES
PATERSON, N. J.

Letters

Reply to Critics

Editor:

Sir:

The comment of Dr. Norton as voiced by Mr. Spencer of General Plastics, Inc. in your August issue, is understandable from a man within the industry. However, some points must be emphasized. These gentlemen infer that the paper ("The Use of Molded Plastics in Applying Wood Veneer"—MODERN PLASTICS, June 1935) is misleading and not authoritative. Moreover, they state that pressures such as specified are sure to "crush the wood fibre beyond recognition; showing that they have had very little practical experience."

We affirm our original statement that the wood fibre was not damaged in the experiments reported. I can submit a sample to prove my point.

Our original paper calls attention to a dearth of publications on the general subject of phenolic resins as bonding agents in the veneer industry. Messrs. Norton and Spencer have cited only some patents most of which are well known to us. The writers feel that patent claims are far different from basic information gathered in an impartial manner and published without thought of financial consideration. We have no desire to impair the glory of any patented process; we are interested in developing a general understanding of the possibilities and have showed that even people "with very little practical experience" have been able to do what the experts "know is impossible."

L. E. Stout
Assoc. Prof. Chemical Engineering
Washington University
St. Louis, Mo.

They'd be good for Poker, too

Editor:

Sir:

Getting an occasional copy of your magazine and being very interested in plastics and developing a small plant on the coast to fabricate cast resins, I am taking this liberty of writing you to suggest an idea that occurred to me some months ago when our state put on a sales tax of 2%. I am enclosing one of our tokens for collection of this tax. The idea again occurred to me when the Secretary of the Treasury recently announced that the Federal Government was going to mint small coins of a $^1/_8$ and $^1/_2$ a cent, etc., for collection of sales tax as these state issues are illegal if put to a test.

My idea is to make these coins from plastics. As a suggestion, stamped and embossed from laminated stock or impact molded. They could be made all the same size, and colors used to designate the value. Their light weight, ease of identifying from regular money, wearing qualities and I imagine lesser cost than metal would all be in their favor. I can think of many reasons why plastic tokens would be superior to metal and not one against their use.

Now apart from the above, think of the tremendous boost to the plastic industry the free advertising would bring, overnight the whole country would know about plastics, this would be the one great chance to put plastics before the public and make a profit while doing it.

This seems to me an unparalleled opportunity. It will require plenty of work and cooperation to put it over but the problems should be faced by the industry as a whole. The volume of material will not be so great and I can foresee some difficulties in the way of prejudice by the public, new material for mint employees to adjust themselves to, etc., but these are not insurmountable if the idea is sound and the day that plastics become money, even if less than a penny, that day will bring a tremendous boost to the industry.

A. Eckley

1709–24th Ave.
Longview, Wash.
August 1, 1935

Supplement to World Chemical Survey

A survey of the chemical industry in Italy, Poland, Denmark, Greece, Turkey, and British India, has just been issued by the Commerce Department's Chemical Division as a supplement to a bulletin on the same subject issued in June, according to advices from C. C. Concannon, who states that the original bulletin together with the supplement just issued completes the world wide survey of the chemical industry begun in the early part of 1935.

This supplement consists of a booklet of 42 pages which deals with recent chemical developments in the countries mentioned.

Foreign and domestic trade, production, consumption, cartels, trade agreements and all other factors necessary to round out a picture of chemical developments in these countries, are included.

The whole field of chemicals and allied products, including heavy chemicals, chemical specialties, fertilizers, paint products, naval stores, medicinals, toilet requisites, dyes, plastics, coal-tar and non coal-tar products are covered in each country where they are of importance.

This publication, Trade Information Bulletin No. 824, can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., or from any of the Department's District Offices located in the principal centers of the country, at 5 cents per copy.

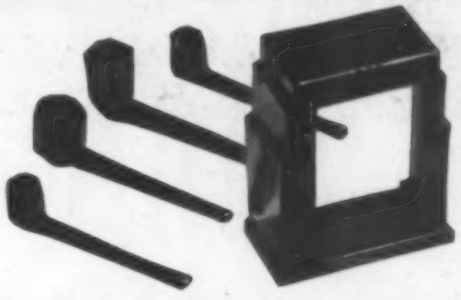
This new Stokes "DDS-2" Rotary Preforming Press—latest in a battery of four in one of the country's largest electrical plants—is one of several new models described fully in new Catalog 33-T.

Write for Copy

FJS STOKES MACHINE COMPANY

Process Equipment Since 1895

5934 TABOR ROAD OLNEY P. O. PHILADELPHIA, PA.



AS OLD AS THE INDUSTRY

Watertown Plastics experience is part of the root history of the plastics industry. More than twenty-five years ago, while the plastics industry was being born, we started to solve plastic problems and make molded plastic products. NEILLITE, an exclusive Watertown Plastic Compound, is one outgrowth of this long and thorough experience. Your inquiries here are always welcome and receive the active attention of real pioneers in molded plastics. Write us freely today.

WATERTOWN MFG. CO.

WATERTOWN, CONN.

Let this BETTER COMPASS point your way to GREATER SALES

Pocket compasses hadn't changed in fifty years . . . until the Taylor Instrument Company called upon Diemolding to produce the case for this one. Dealers kept the old ones in stock to accommodate sportsmen and called it a good week when they sold one.

Now . . . with a dent-proof, water-proof strong and light case, these Leedawl Compasses are selling on sight . . . to sportsmen, to motorists, to people in every walk of life.

New design . . . plus the advantages of cleverly planned molding . . . can open up new markets for your product as it has for Taylor. Diemolding designers and engineers will gladly cooperate with you in planning a better product. Write

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CANASTOTA, NEW YORK

IMPORTED and DOMESTIC

WOOD FLOUR

FOR PLASTIC FILLERS and MOLDING

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UNIFORM QUALITY

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25 to 120 MESH
SUITED TO YOUR OWN FORMULAS

STATE CHEMICAL COMPANY
80 West Houston St.
New York City

THINK IT WILL RAIN?

(*Continued from page 36*) metal. The problem was not so simple. Plastics were chosen because they could be *fabricated and sold* to yield a better profit than metal. Plastics' superior appearance permitted a sale price that made marketing attractive to both manufacturer and retailer. When both these factors are carefully considered, plastics win out in innumerable instances.

With the decision made in favor of plastics, the design, which closely followed the European model, was submitted to the Hammond sales department. Refinements were suggested here which further strengthened the case for plastics. Finally, models were made calling for a molded phenolic housing (in two parts), a knob and a shaft. The bottom of the housing consists of a flat plate with three small lugs on its lower face, permitting the device to be set down on any convenient surface—such as a rock or tree stump—without drawing up moisture. The upper portion of the housing, which slips over its lower counterpart, has a number of holes cut into its face, through which the hygrometer element can be seen. Lettering, including directions and trade-mark identification, is recessed, and made to contrast with the black face by the use of wiped-in color. The knob, which is set into the center of the circular housing, is fluted to permit easy turning and contains the small compass recessed in its top.

"The dealer reaction," Mr. Pattee states, "has been highly favorable. In fact, before our molds were completed, our salesmen had sold several thousand instruments and this initial volume far exceeded our expectations, so much so that during the making of the molds, plans had to be developed to increase the number of cavities to permit greater production. Notices in scientific and sporting goods journals and in the daily press were uniformly favorable. The novelty of the instrument has kept sales at high point and we anticipate a steadily increasing demand for some years to come."

Questioning of retail store clerks brought out other factors in favor of plastics. Invariably they reported consumer questioning as to the rustproof qualities of the housing, a point of great importance to the sportsman. Their ability to answer this question favorably—because of the use of plastics—was reported as a major factor in closing sales. Lightness in weight, freedom from breakage and the extremely low price were found to be strong selling points. Analysis will disclose that, in each case, plastics, account for the qualities mentioned in whole or in part.

Thus, while no single advantage operated as a controlling factor, the sum of plastics advantages—from the viewpoints of cost, of selling price, of utility, of appearance and of consumer acceptance—has served, in definite and conclusive manner, to make this instrument a successful addition to the Hammond line.

Credit: To the August F. Markus Eng. & Mfg. Co. for mold manufacture and molding; and to General Plastics, Inc. for Durez used in molding.

WHAT SHAPES FOR PHENOLICS

(*Continued from page 21*) this is not so necessary.

Another instance which bears out this general rule is the Arvin auto radio control unit, also molded of black phenolic with ivory urea knobs and bezel by the Reynolds Spring Company. Here again there is not a single flat surface in the whole exterior and the device has unquestionable appeal and sleekness, marred only by the screw head seen on the side.

● This kit for hypodermic needles—above—was molded of phenolic by Norton Laboratories for the MacGregor Instrument Co. There are no flat surfaces in its design

The third illustration shows a kit for hypodermic needles molded by Norton Laboratories for the MacGregor Instrument Company. This is an all-black phenolic molding and is also unusual in that there are no flat surfaces on the entire case. It is an extremely rich-looking and efficient device, slides easily into vest pockets and can be cleaned inside and outside with alcohol, since the inside pad is molded of soft rubber. There are no protrusions or decorations to catch dust, and its unusual sleekness can be attributed mostly to the curved exterior surface.

It is interesting to note that there was never the slightest inclination on the part of designers, molders or distributors of these articles to use any imitative "walnut or mahogany" effect. Why? Because they looked better in black. In instances where products are not so well designed and haven't the curved reflective surfaces, the tendency is to use a urea color or—if price forbids that—to revert to the old imitative wood effects to get a semblance of surface texture. As we learn more of designing for plastics, there will be fewer of these expedients used, and molded products will become richer looking and more appropriate to their function.

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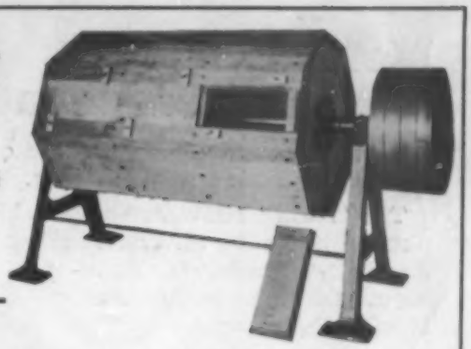

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NEW PARKER DESK SET

(*Continued from page 24*) designed some very fine plastic and die cast combinations and is certainly high among the leaders in this particular field. His old line of cigarette boxes and novelties are still well remembered, and this, his latest job, carries on the same tradition of design ingenuity, based on a thorough engineering knowledge of both materials. He has used the plastic materials most effectively in the pen receptacles where appearance is the prime factor and weight secondary. In the bases where weight is an advantage he has used zinc die castings to achieve this weight. The Doehler Die Casting Company's extensive research on the finishing of zinc, aluminum and bronze die castings assured the designer that color combinations could be made on the metal which would have the same brilliance and depth as the basic plastic colors. Again the combination of chromium and color, as used, gives some very pleasing high-light effects in the individual designs. Credits: to Bakelite Corp., for materials used in pen receptacles and Westclox watches; and to Toledo Synthetic Products, Inc., for Plaskon used in Westclox watches of the lighter colors.

TWO-TIMING MOLDS FOR PROFIT

(*Continued from page 19*) such very strong light.

Metals are successfully combined with plastics in the manufacture of many things and there is no reason why they should not be combined in the making of lamps. Cast plastics, which may be machined and turned on a common lathe, can be secured in rods, tubes and sheets of almost any required dimensions and in a range of pleasing colors. There is no question its suitability for lamp design, nor is there any question of its acceptance by the public which already prefers 70% of its costume jewelry and many other things to be made from this material.

Molded phenolics and ureas will take any shape and form the designer's pencil indicates and the entire range of the plastics spectrum of color is available from the same mold. Molds are frequently considered expensive. Usually made of hardened steel which must be machined and polished into intricate shapes, they require time and labor to make. But when quantity production of lamp bases or other objects is to be turned out, it must be remembered that the costs of finishing such merchandise are almost entirely eliminated. When a casting comes from the mold, there is but a moments job of removing fins and a touch or two on a buffing wheel and it is ready for use. This saving in labor offsets much of the original mold cost and if any considerable quantity is manufactured, total costs are frequently lowered. There is a new development on foot whereby molds are being cast of metal which requires no machining. The time necessary for making such molds is materially reduced with incidental lowering of costs, especially on large pieces.

Quaker Lamp Company has pointed the way for other manufacturers to avoid mold costs where suitable existing molds can be found. A retired mold, even though it has enjoyed a long and busy life, may still be useful in other fields which a little imagination will bring into view as this story reveals. A little time spent with a nearby molder may turn up interesting opportunities in any field of endeavor. Molders, too, if they ever have a dull day, might spend it to advantage looking over old molds for two-timing opportunities.

PRODUCTION RELATIONSHIP TO SIZE OF MOLD

(*Continued from page 16*) ment of competitive prices, yet comparatively little consideration is given to this phase of the business. In other words, a quoted price even fifty per cent lower than that of the nearest competitor is practically useless if there ever occurs a complete cessation in production. Such a condition is far from remote for, whether it be a thirty or sixty cavity die, a breakdown in the press or mold is not improbable. Many kinds of accidents may occur, and in most instances, mishaps present themselves at just the time when peak production is indispensable. What is the result usually? The press has to be dismantled and the mold taken to the machine shop for repair. A week, sometimes even ten days, are required to have the mold in working order once more. In the neantime the customer has become almost frantic and in many instances removes the mold at his first real opportunity. He is most certainly justified in taking action which will insure him against the repetition of any such predicament, and it becomes the onus of the molder to seek definite means of preventing such incidents.

By the adoption of a very simple method, the risk of not being able to produce the molded parts required may be practically obviated. There is, of course, no way in which one hundred per cent production can be guaranteed, but at the expense of a slightly higher unit cost, definite assurance of at least one-half can be promised at all times. Insurance that constant and uninterrupted deliveries will be maintained is of utmost importance to the manufacturer and the means of attaining this end is within the reach of any plastic molder who is desirous of emphasizing this provision. There is no question but that both the vendor and user of molded products will derive benefits from any such guarantee and the buyer will have much more confidence in his source of supply if he at no time is faced with the embarrassment of a breakdown.

Let us assume for example that a sixty-cavity die has been finally selected as the size necessary to fulfil the peak requirements of a certain item. What would happen if the molder had two thirty-cavity molds made instead of one sixty-cavity? Would the two smaller dies serve equally as well? On first thought it might appear quite impractical to split a large die

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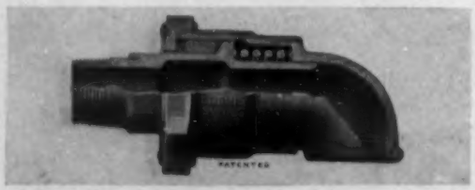

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into two smaller ones and the question that immediately arises in our minds pertains to comparative costs. If, however, the cost of manufacture is not seriously increased and there is a greater guarantee of steady production, then the procedure can readily be considered as practical. For the time being let us assume that on the basis of using two thirty-cavity dies the parts can be produced at the same cost as that when the parts are produced from a sixty-cavity mold. The advantages to be derived from a production standpoint are immediately recognized, for in the event that a press breaks down there is always the other press to continue operation. Similarly, if one of the molds becomes worn or needs to be taken out for any repair work, there is always the other mold to carry on production at half the rate. True enough, there is a certain curtailment of work, but at least partial shipments can continue until the two dies are again operating.

The question now arises as to whether or not two smaller molds can produce at a rate in proportion to a large die of twice the capacity; in order to determine this it becomes necessary to make comparison by diagram. We shall say that in a certain plant the operator commences his shift promptly at two o'clock in the afternoon. He, of course, is carrying on where his predecessor left off and assuming there to be no interruption in the course of cycles, operates the two presses A and B as shown in Figure 1.

As can be seen, the cycles of the two thirty-cavity dies are illustrated with the operator commencing his work by closing an already loaded press. At 2:00 P.M. he closes Press A and one minute later ejects the heat from Press B. From there the process continues and allows for a cure time of three minutes in each cycle. By following through this procedure it can also be seen that after an elapsed time of twelve minutes, approximately 180 pieces have been produced. This means that about 900 should be made every hour and on a three shift basis would amount to approximately 20,000 pieces a day.

Turning now to the sixty-cavity mold and analyzing the procedure at the press we assume the operator starts his work under the same conditions and at the same time as the one heretofore mentioned. In this instance, too, a cure time of three minutes is used and his operations for twelve minutes are concerned with only one mold (see Figure 2).

It will be observed that by the time the press is closed for producing the fourth heat exactly the same number of pieces have been produced and consequently by the end of the day, the amount of work ready for the finishing room will be identical with the first case. Of course, it will be noted that in the first instance a two press example was considered, while the latter deals with one press to the operator. But even if the man operating Press C were to be given another die to work in conjunction with the sixty-cavity die, he would be unable to increase his rate of production on the pieces made in the latter. On a one press basis

there is a decided waste of labor time due to the idleness involved during the cure of each heat. This immediately brings out the fact that the comparative costs vary to a certain extent, but it also proves definitely that so far as production is concerned, it makes no difference whether one sixty-cavity, or two thirty-cavity dies are utilized by the operator.

It now becomes important to consider the comparative costs, and undoubtedly the best approach to this angle is by way of analysis of the operator's time at the press in each instance. We know that it is more expensive to run a single press to the man due to the amount of time wasted in having him idle while the pieces are being cured in the mold. Consequently, if a sixty-cavity die were to be used as above illustrated, there is no question but that another mold would be operated in conjunction with it. Hence it is evident, that with the production a constant, the use of two smaller dies is less economical than operating only one of twice the size. If we refer once more to the diagram which illustrates the press having the sixty-cavity die, it will be noticed that the time wasted by the operator is to be found only between the time of filling the preform rack (or weighing out the powder load, as the case might be) and the subsequent opening of the mold. Keeping in mind that it takes longer to both eject and refill a large multiple cavity mold as compared to performing these operations on a smaller die it follows that not very much time will be left for idleness. During the cycles illustrated it would be safe to say that not more than three minutes would be wasted out of the twelve. It therefore follows that approximately fifteen minutes will be squandered in every hour. If we now determine how many pieces have been produced in one hour and assume the operator's rate of pay to average 44 cents an hour we can then obtain the basic increase in cost per thousand pieces. Inasmuch as 180 pieces are produced in every twelve minutes; in an hour there are approximately 900 pieces made. During this hour fifteen minutes of the operator's time have been wasted and almost a thousand pieces produced, which means an additional expense of about 11 cents per thousand. This figure can definitely be asserted to be the difference in cost between the large mold and that of using two smaller dies and it is not a difficult task to compute the difference in cost for any multiple cavity mold. It should be kept in mind, however, that the 11 cents additional is actual labor cost only and does not include the usual overhead and various incidental percentages and contingencies necessary to arrive at the difference in selling price.

In summing up the situation it would appear that there are distinct advantages in dividing a large mold into two smaller ones, for at small expense the customer can be assured of constant production at all times. No more does he have to fear a complete breakdown due to unforseen defects in the mold or lack of a large enough press to properly close an exceptionally large mold. From the viewpoint of the molder, however,

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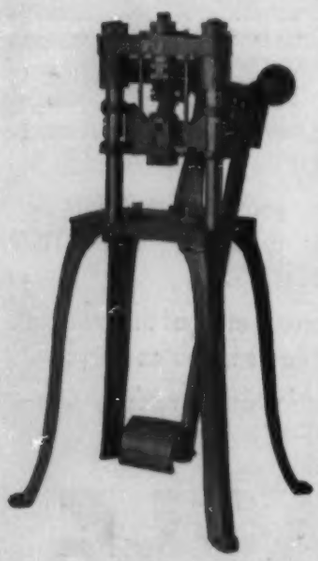

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there are many disadvantages to be considered. In the first place, the use of two presses necessitates the utilization of added floor space which is sometimes badly needed in times of peak production. Secondly, the fact that the pieces actually cost more to make tends to set up a definite sales resistance in many instances, and finally, recognition must be made of the added inconvenience to the molder of additional maintenance and office listing. To offset these numerous detriments, though, are the advantages of easier handling and consequent saving in time and money; the reduction of risk in the event of an accident; and most important of all, a satisfied customer.

It should be understood that the entire problem is worthy of consideration only in cases which involve large production molds and has no application in instances where small dies of five or ten cavities only are required. Whether or not a large mold is to be split up should be entirely optional with both the molder and his customer and the decision should be predicated chiefly upon what weight the customer places on his production requirements.

MOLDINGS FROM ENGLAND

(*Continued from page 15*) Presses with side rams for use with split molds necessitated by undercuts or lateral holes seem to be in quite wide use. On the whole presses are very well constructed and there recently has been some good development work on the part of press manufacturers to produce presses more suitable for present-day molding needs.

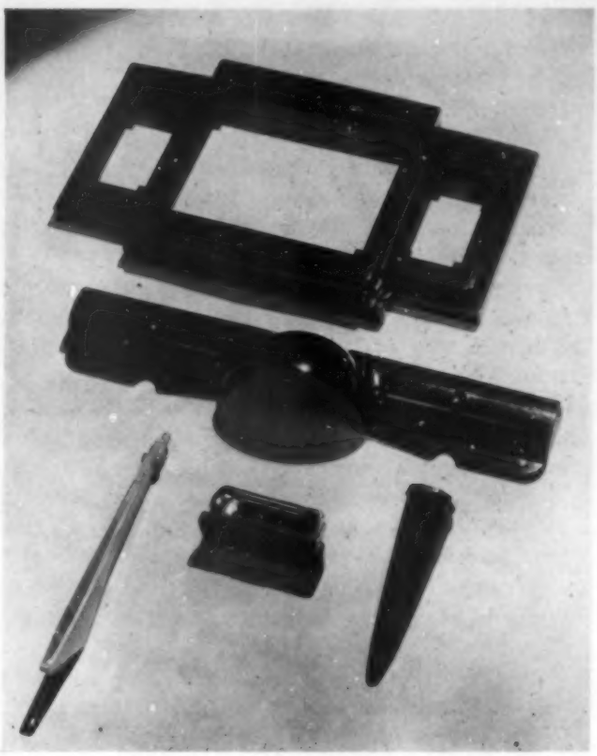
Molds are for the most part of similar design and construction to those in the United States. Some for producing complicated pieces are of quite intricate design. Orders for a given item are, as a rule, smaller than in the United States, hence most molds have fewer cavities. Mold costs are definitely lower and this has no doubt been a factor in developing the wide variety of molded articles.

In some cases a semi-injection arrangement is used whereby the material is forced through a comparatively small opening into the cavity itself. This prevents breakage of pins and inserts and helps to confine the material in the cavity proper thereby preventing loss of pressure and waste of material. There is some injection loading of molds which are immediately placed in a separate press for cure under pressure. Apparently less attention is paid to the proper polishing of molds as castings seem to have a rather poor finish and require more buffing than should be necessary.

In the majority of instances, heating seems to be by gas or electricity. The electrical rate is comparatively low so that this method of heating is sufficiently economical. The cost of heating a mold electrically in a one hundred ton press may run as low as four cents or slightly more an hour.

Plants operate in general on a piece work basis at lower rates than those prevailing in the United States.

Curing time is fast, twenty-eight millimeter bottle caps requiring only forty-five seconds. Considering the small number of cavities in the molds, production is really quite high and it is readily seen that great attention has been given to the details of the molding operation resulting in a high standard of efficiency.



Molded instrument panel for automobile dash board at top. Protective waterproof cover for distributor and ignition wires below. The translucent signaling device (lower left) carries a tiny electric bulb. When the car is about to turn left or right, this device rises and lights to warn drivers of other cars. Automobile ash receiver and flower vase (lower center and right) are also molded, with metal linings

When it is borne in mind that the plastics industry in England started some years later than in the United States one realizes that the industry has done a remarkable job of developing and promoting the sale of molded parts and articles. There has been an extremely progressive attitude and a willingness to gamble that new molded items will prove satisfactory and profitable.

One of the outstanding fields of development has been molded hardware for buildings and ships. In the beginning, this development was discouraged by established hardware manufacturers but certain molders showed sufficient enterprise to start producing molded door knobs, escutcheon plates, and push plates in a small way. Gradually a complete line was developed and the business grew to large proportions. Today it is

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estimated that fourteen small molding concerns are almost entirely supported by this hardware business. Of course, established manufacturers realized that they must have a part in it and some of them have installed molding plants while others purchase the necessary molded items from trade molders. The present boom in building has further stimulated this business and molded hardware in a great variety of designs and in good quantity is proving a boon to molders and material manufacturers. The majority of door knobs are made solid but even so, are cheaper than good grade metal knobs of comparative size and design.

Some markets entered have been lost again due to poor quality caused by thoughtless price competition. An example of this is clock cases which were made in large quantities a few years ago but have recently been dropped in many instances for reasons almost identical with those in the United States.

Much enterprise has been shown in the production of large pieces. Practically all radio cabinets are molded and in size they will average twice as large as those molded in America. One cabinet approximately two feet by three feet is being produced in good quantities and it is said that the two cabinets produced by one firm consume ten tons of material a week. In spite of the cost of these large molds, designs are changed each year. Another large article in regular production is a drain board for kitchen sinks. Most of these are made in white urea material. At present it is stated quite definitely in several quarters that molded coffins will soon be in regular production.

Smokers' articles make up quite a large volume of business. These are seen in nearly all stores and include ash trays, humidors, cigarette boxes, cigarette and cigar cases, tobacco pouches and match boxes of all kinds and descriptions.

An interesting household article is a coffee or tea table top about three feet in diameter. The surface is a rather intricate design. The plain surfaces are rough and grained in appearance to prevent scratches from showing. The color is dark brown approximating one of the more expensive woods and a layman in looking at it would never guess that it was not an expensive carved wood. There are many molded trays including very plain white urea ones for use in butcher shops and grocery stores. These seem to be selling in good volume and are very satisfactory in use.

Electric meter cases providing good insulation and ease of assembly are among new developments and supply increased business for many molders. The packaging field has not been neglected by any means. Molded closures are made in quantities as great as in the United States in proportion to the population. Shaving soap, razors, lip stick, rouge, and mascara are all found in molded containers. Cream jars of urea material are used for creams with an oil base. Ink is sold in molded containers and there are various pen stands and desk sets in stationery stores.

Proper design has played a very important part in developing much of this business. Many of the articles

seen are particularly attractive and in most instances the workmanship and finish are quite remarkable. Great stress is laid on design at present and some of the larger molders employ a designer regularly in order to constantly submit designs of proposed molded articles to prospective customers. One concern had in the hands of prospects one hundred and fifty designs at one time out of which it expected to get a good percentage of orders. To date this method of selling has proved very effective and profitable.

Color effects to a large extent have had a tendency to imitate wood. This has resulted in a variety of walnut and mahogany shades. Some contrasting color effects are used but the public seems to prefer walnut and mahogany on radio cabinets and smokers' articles.

The great variety of molded articles in five-and-ten-cent stores, tobacco shops, stationery stores and exclusive department stores makes one feel that the public in England has been made far more plastics conscious than in America.

For some years there has been a rather strong trade association in the plastics industry in England. While it is generally admitted that this association is far from perfect and falls short of accomplishing all it might, there is a definite feeling that the association has been a helpful and stabilizing factor. Through its meetings, luncheons and golf tournaments the important men in the industry have become well acquainted and much more inclined to talk over mutual problems in a friendly way rather than to fight each other to the last ditch. Destructive price competition has been minimized. Standard sales conditions have been established. Proper exhibitions have been promoted and in some instances group exhibitions of the plastic industry arranged for places where no individual manufacturer is allowed to exhibit. At present, a hall mark of quality is being considered. Definite specifications of cure and grade of material would be set up and this hall mark allowed only to those molders agreeing to live up to all the specifications. This mark would then be used on all articles produced by those molders having the right to it to identify their products.

The association has sixty odd members including five each of press manufacturers, powder manufacturers and mold making concerns. While their problems differ, it is generally felt that the industry has many common problems and can make the greatest progress by sensible discussion and cooperation. It would seem that this association has been a definite factor in the rapid development of the plastics industry in England.

No visitor can avoid being deeply impressed by this rapid growth and he is aware that great ability, initiative and courage have been combined to make it possible. Plastics people in America can ill afford to overlook what is going on across the sea and could learn much by observing it.

Those interested in seeing the moldings here illustrated will find them displayed at MODERN PLASTICS, 425 Fourth Avenue, New York.

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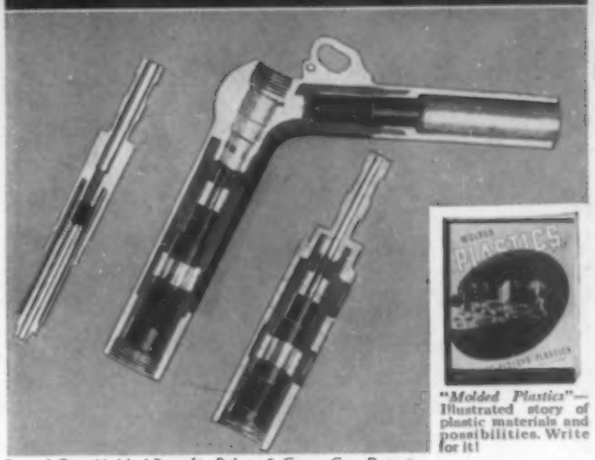

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INDEX OF MODERN PLASTICS ADVERTISERS

American-British Chemical Supplies, Inc. 51
American Catalin Corp. 1
American Insulator Corp. 57
American Plastics Corp. 57
American Record Corp. 49
Auburn Button Works, Inc. 44
Bakelite Corp. ..... Inside Back Cover
Barco Manufacturing Co. 47
Beetleware Corp. 10
Boonton Molding Co. 4
Cambridge Instrument Co., Inc. 61
Carver, Fred S. 52
Cavagnaro, John J. 56
Celluloid Corp. 7
Chicago Molded Products Corp. 58
Claremont Waste Mfg. Co. 61
Colton Co., Arthur 46
Diemolding Corporation 54
Eagle Tool & Machine Co. 59
Fiberloid Corporation, The 6
French Oil Mill Machinery Co., The 9
General Electric Co. ..... Back Cover, 5
General Plastics, Inc. ..... Inside Front Cover
Gering, Inc., Larry 63
Heyden Chemical Corp., The 46
Illinois Testing Laboratories, Inc. 56
Kurz-Kasch Co., The 59
Logemann Bros. Co. 45
Loomis, Evarts G. 58
Makalot Corporation 48
Marblette Corp., The 2
Monsanto Chemical Co. 48
National Aniline & Chemical Co., Inc. 50
Northern Industrial Chemical Co. 55
Reichard-Coulston, Inc. 62
Resinox Corp. 8
Reynolds Spring Company 63
Shaw Insulator Co. 60
Siebert, Rudolph R. 55
Standard Tool Co. 60
State Chemical Co. 54
Stokes Machine Co., F. J. 53
Stokes Rubber Co., Jos. 51
Tennessee Eastman Corp. 37
Toledo Synthetic Products, Inc. 28–29
Unyte Corporation 41
Waterbury Button Co., The 43
Watertown Mfg. Co., The 53
White Engineering Laboratories, Inc., The 52